NUEXCO REPORT 172

FIGURES OF THE MONTH

	This Month	Last Month	12 Months Ago
	(Referenced to November 30, 1982)		
Exchange Value[1]	19.75	17.50	23.50
Transaction Value[1]	17.55	17.00	24.10
Conversion Value[2]	1.45	1.60	1.20
Loan Use Charge Rate[3]	6%	6%	6%
Near-Term Uranium Supply[4]	5.2	4.3	7.1
Near-Term Uranium Demand[5]	5.2	2.1	3.1
Near-Term Supply-Demand Ratio	1.0	2.1	2.3
Current Transactions[6]:			
Number of Transactions	9	9	1
Quantity of Material[7]	6.1-12.1	1.4-3.0	0.05-0.1
USDOE SWU Prices[8]:			
AFC	138.65	138.65	130.75
Requirements	149.85	149.85	127.59
Optimum Tails Assay[9]	.329	.341	.305
Calculated Price of Enriched UF_6[10] [11]:			
2.5 w/o U_{235}	693.19	668.30	709.04
3.0 w/o U_{235}	895.97	865.68	912.30
3.5 w/o U_{235}	1,102.91	1,067.20	1,119.48
4.0 w/o U_{235}	1,312.91	1,271.79	1,329.55

---

[1] US $ per pound U_3O_8 equivalent
[2] US $ per pound U as UF_6
[3] Per annum
[4] Active inquiries to sell, for delivery within 12 months after contract signing (millions of pounds U_3O_8)
[5] Active inquiries to purchase, for delivery within 12 months after contract signing (millions of pounds U_3O_8)
[6] Uranium transactions only; does not include loans, conversion, or SWU transactions
[7] Millions of pounds U_3O_8, equivalent
[8] US $ per SWU
[9] Percent U_{235}.
[10] Theoretical calculation based on Exchange Value, Conversion Value, 0.20 percent tails assay and the USDOE price for AFC SWUs.
[11] US $ KgU as UF_6

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MONTHLY REPORT ON THE NUCLEAR FUEL MARKET

December 1982 No. 172

R. WESLEY MILLER, *EDITOR*

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FOREWORD

During an extended tour of the Far East, which took him to Hong Kong, Taipei, Seoul, Tokyo and Manila, Nuexco Vice President Wayne Fowler addressed the sixth annual Joint Business Conference of the ROC-USA Economic Council. Excerpts from his speech are presented in this Report, page 17.

* * *

Nuexco's offices will be closed on December 24 and 31.

PRICING

NATURAL URANIUM AND CONVERSION

The **Exchange Value** as of November 30, 1982 is **$19.75** per pound U_3O_8, up $2.25 since last month. The upward price pressure first sensed in September, and which clearly manifested itself during October, grew stronger during November, especially during the latter part of the month.

Buying activity was quite vigorous; the *Current Market Data* section lists nine uranium sales transactions, involving approximately ten million pounds U_3O_8, equivalent. The four long-term transactions accounted for approximately 80 percent of that amount, while five spot or near-term transactions accounted for the balance.

* * *

Active uranium supply (material offered at competitive prices, terms and other conditions) amounts to **5.2 million pounds U_3O_8**, equivalent, in the near term, an increase of almost one million pounds from last month's level of 4.3 million. Even after spot and near-term transactions representing two million pounds U_3O_8 were concluded during the month of November, **active uranium demand** for spot or near-term delivery jumped to **5.2 million pounds U_3O_8**, equivalent, a 150 percent increase. Therefore, the **supply-demand ratio** declined to 1.0:1, the first time in recent memory that the demand component has equalled or surpassed the supply figure.

* * *

The **Transaction Value** as of November 30, 1982 is **$17.55** per pound U_3O_8, up $0.55 from a month ago. The current Transaction Value includes 20 transactions totaling 4.9 million pounds U_3O_8 and covers a period of three months. The time lag built into Transaction Value prevented it from reflecting all of the upward price movement which occurred during November, because it is heavily influenced by transactions reported in September and October, when prices were substantially lower.

* * *

The **Conversion Value** as of November 30, 1982 is **$1.45** per pound U as UF_6, down fifteen cents from a month ago. However, the thin secondary conversion market remains very volatile. Five active sellers are competing for orders from only two active buyers. Sellers intensified competition by reducing their offering prices in the latter part of the month. **Active offers to sell conversion services** in the near term amount to approximately **2.9 million pounds U as UF_6**, an increase of 1.2 million pounds U since last month. **Active conversion demand** rose to **1.6 million pounds U as UF_6**, five times last month's level. All of the increase was due to the entry of one buyer of a large quantity. In a market having so few participants, such apparently dramatic changes in supply and demand are not necessarily meaningful. What is meainingful, however, is the fact that any single buyer or seller can have even more significant influence on the secondary conversion market than is the case in the spot/near-term market for uranium.

* * *

The **Loan Use Charge Rate** remained at six percent per annum. The limited activity in the market is at or near that level, but there are very few participants. One small loan transaction is reported in the *Current Market Data* section.

* * *

This month's 13 percent increase in the Exchange Value is the second largest percentage increase in history, exceeded only by a 17 percent jump in December 1975 ($30.00 as of November 30 to $35.00 as of December 31.

Several factors contributed to the price rise.

1. As noted last month in Report 171, the most aggressive sellers have largely completed sales campaigns begun earlier in the year. With sellers demanding higher prices, buyers, whose appetites had been whetted by the prospect of bargain purchases, suddenly began to find a more difficult market and, in turn, had to become more aggressive to complete desired transactions. The sellers also sensed the shifted market dynamics and moved their offering levels higher.
2. Last month's fifty cent increase in the Exchange Value (from $17.00 to $17.50 per pound U_3O_8) appears to have been viewed by both buyers and sellers as a signal that spot prices have bottomed and are rebounding upward.
3. Expectations that the proposed uranium embargo would be enacted may have been a contributing factor.
4. Market activity that has taken place near the end of most years added impetus to this month's upward price pressure. Two purchases of odd lots (less than 100,000 pounds U_3O_8) were made, and prices in that type of transaction are beginning to edge upward. In a sense, prices for odd-lot transactions can be regarded as indicative of the type of market that exists. For example, in a buyers' market, prices for odd-lot transactions may

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very well be lower than those for larger quantities, as a result of the buyers' greater relative market strength. On the other hand, in a sellers' market, a buyer who needs to satisfy a certain set of conditions, such as a small quantity of material in the form of U_3O_8 of US origin, for immediate delivery at a particular converter may well have to pay more to meet all of these specified requirements than would a buyer interested in adding to inventory generally, without particular regard to national origin, location or timing.

5. More than 90 percent of current buying is being done by utilities adding to inventory which, in some cases, won't be utilized until the late 1980s and, in at least one case, until after 1990. Such behavior suggests that these buyers believe that purchases at the current spot market price plus carrying charges will turn out to be less expensive than waiting to purchase nearer time of actual use in a reactor. These buyers are indicating their judgments that uranium prices, in constant dollars, will rise substantially in the longer term. Such inventory purchases would be expected to continue (while cash remains available at relatively favorable terms) until the spot prices begin to approach the present value of expected future prices.

The psychological aspects of spot price movements are substantial and predictions as to duration and magnitude of any particular move are often more intuitive than objective. It would be easy to speculate that, in view of the existing momentum, the current move will carry further. However, the House of Representatives' decisive defeat of the proposed US uranium import embargo could have the opposite effect. To forecast a sustained price rise would be premature at this juncture.

ENRICHED URANIUM AND SWU

The short-term secondary SWU market remains quite active. A number of US and non-US DOE requirements contracts holders who terminated deliveries are actively soliciting offers for replacement material from secondary market sources of both DOE and Eurodif SWUs.

Discounts offered by DOE secondary market sellers for FY 1983 deliveries remained unchanged from last month, at about $25 per SWU from DOE's AFC price when calculated at .2 tails. Discounts offered from DOE's price for AFC SWUs being offered by Eurodif sellers are substantially more, in the range of $35 per SWU at .2 tails. A number of US utilities have recently expressed strong interest for the first time in investigating purchases of Eurodif SWU due to the price differential.

Discounts for DOE SWU in FY 1984 remain unchanged at about $28-30 per SWU from AFC price at .2 tails. Offers from Eurodif sellers are made in terms of a base price plus escalation, and cannot easily be compared to the offers of DOE sellers since the DOE FY 1984 AFC price is not yet known. It would appear, however, that the offers by Eurodif sellers will result in a significantly lower purchase price in FY 1984 than is available for DOE SWU.

The market for DOE SWU for delivery for FY 1985 and later remains almost non-existent as potential sellers await DOE's announcement of the terms and conditions of conversion to the FR contract.

* * *

THE IMPACT OF THE FR CONTRACT ON THE SECONDARY SWU MARKET

Introduction

The secondary SWU market has undergone dramatic changes in the past few years due to changes in the contracting policies of USDOE. The latest contracting change, the introduction of the FR contract, can be expected to cause further major changes in the secondary SWU market. In order to understand the significance of the introduction of the FR contract, it is important first to obtain some perspective by reviewing the reasons for development of the SWU market that now exists.

Development of the Market

There was virtually no secondary SWU market under the Requirements contract. There was no need for a secondary market, since no customer had excess SWU commitments to sell. A customer simply specified a desired delivery six months in advance, and no delivery was scheduled unless it was actually needed. Buyers had no choice but to obtain the material from a primary supplier.

The introduction of the LTFC contract, with its ten-year rolling firm commitment period, created the need for a secondary market to dispose of excess commitments created by reactor construction delays. But there was as yet no real secondary market. Most potential buyers seeking new commitments simply continued to seek those commitments directly from primary suppliers. Some secondary market transactions did take place, but they were limited in number and were partly in response

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to the US government's temporarily closing the order books for US enrichment services.

It was only with the introduction of the AFC contract, and DOE's official reopening of the US enrichment order books, that a real secondary SWU market as it now exists was created. DOE chose to provide contract relief to customers with excess commitments by announcing liberalized schedule adjustment provisions for conversion of existing LTFC contracts to the AFC form. Wholesale schedule readjustments were made upon conversion, and some customers found themselves suddenly able to seek new supply while others were seeking even more economic ways to dispose of excess commitments. Sellers and buyers began to be influenced to look to the secondary market as a viable and economic option to assist in these schedule readjustments.

The secondary market created by the AFC contract policies became almost exclusively one of partial contract assignments between one DOE customer and another. DOE's policy allows new and existing customers to reduce the amount of enrichment services taken from DOE by the same amount obtained on the secondary market from another DOE customer. This mechanism was used extensively to the advantage of both potential buyers and sellers. Discounts available were in the $2 to $3 per SWU range, and the market appeared to be in approximate balance.

As the AFC conversions and schedule adjustments were completed, and the number of new contracts being signed steadily decreased, demand for short-term SWU on the secondary market began shrinking rapidly. A strong short-term buyers' market began to develop as sellers began competing for the few available buyers. Discounts escalated to the $30 per SWU range, and more. As discounts increased, a flood of new buyers—DOE customers partially terminating the older requirements contracts containing 3.5 year termination provisions—entered the market, effectively putting a ceiling on discounts. Since then, discounts have decreased slightly to about the $28 per SWU range, where the market stands today.

At the same time, the number of long-term sellers with excess SWU commitments far out in time who need to dispose of them has been decreasing substantially. There are few customers with excess commitments after about 1987 or 1988 that have not already made some accommodations to use up the commitments, such as arrangements to pool with other reactors. There were, for example, more buyers wishing to take assignment for FY 1988 SWU on the secondary market than there were potential assignors wishing to complete such transactions.

Effects of the FR Contract

The driving force of the secondary SWU market has always been the need to dispose of excess DOE commitments. The long-term effects of the FR contract will, therefore, depend on the effect the new contract has on the amount of excess SWU commitments. The short-term effects cannot be known until DOE announces the terms and conditions of conversion. The long-term effects, however, are apparent from a quick review of the contract's terms and conditions.

The FR contract contains a 2-year rolling firm commitment period rather than the 5-year period of the AFC contract. As a result, the amount of firm commitments made by customers to DOE will be drastically reduced. AFC customers, for example, were required on July 1, 1982, to specify firm commitments to DOE for FY 1988 if their contracts did not already contain such as part of an initial delivery period. Under the new FR contract, firm commitments for FY 1988 in such a case would not have to be made until April 1, 1986.

If, as expected, most AFC customers choose to convert to the FR form, in the long run there will be much less excess SWU that could be available for sale on the secondary market. Some excess commitments will continue to exist due to unexpected reactor startup delays and outages. But DOE customers will not be faced with the possibility of selling or possibly carrying unneeded inventory for 6 years or more. At most, a customer could be faced with 3 years of unneeded commitments. As a result, the economic attraction of selling as against buying and holding will be reduced. Therefore, the discounts offered by potential sellers will be much less than at present.

On the demand side, the long-term effect of the FR contract will be to tend to decrease secondary market activity. The FR contract states that DOE must be given 30 months notice if a customer is to reduce the amount of enrichment services taken from DOE directly by buying DOE SWU on the secondary market. Under steady state conditions, there would be no FR contract holders with firm commitments that far ahead. Sellers would have to come from any remaining LTFC or AFC contract holders, or inventory holders who had not yet been able to sell material. Also, the attractiveness to the buyer of taking material on the secondary market is greatly reduced, since commitments to purchase on the secondary market would have to be made in advance of

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normal commitments made to DOE. It is questionable whether there would be any sellers offering discounts making it worthwhile for a secondary market buyer to accept this increased scheduling risk.

Requirements contract holders will most likely find discounts offered by DOE sellers to be too low to allow economic termination of requirements contract deliveries and their replacement with secondary market SWU. If such buyers are to continue their secondary market activity, they will most likely have to begin purchasing replacement SWU from Eurodif sellers.

Under long-term equilibrium conditions following wholesale conversion to the FR contract, there seems to be little room for the existence of the traditional DOE customer-to-DOE customer secondary SWU market that exists today. Its most likely replacement will be a new secondary market driven by Eurodif excess SWU commitments, with the most likely buyers being the DOE customers with the old requirements contracts containing 3.5 year termination provisions.

The short-term effect of the conversion to the FR contract on the secondary SWU market will depend on the terms and conditions of conversion, which DOE is expected to announce in the spring. There may be a short-term burst of activity, similar to that which occurred with conversion to the AFC contract. The immediate effect on the demand side should be to increase the number of potential intermediate term buyers, due to the sudden shortening in the commitment period. Whether there will be many secondary market sellers to meet that demand will depend on the terms and conditions of schedule adjustment offered with conversion.

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EXCHANGE VALUE $19.75/lb. U_3O_8
Determined as of November 30, 1982

Definition[1]

The Exchange Value is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the last day of the month.

Derivation

Nuexco bases the Exchange Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Exchange Value:

A. The price of uranium delivered or to be delivered under old contracts.
B. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.

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[1] In December, 1981, Nuexco published a history of the Exchange Value which chronicled, month-by-month, changes in its definition, usage and derivation. Copies are available upon request.

TRANSACTION VALUE[2]
Determined as of November 30, 1982

$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
17.55	4.9	20	3

Definition

The Transaction Value is a weighted average price of recent transactions, and is based on prices paid for U_3O_8 in transactions closed within the previous three-month period and for which delivery was scheduled within one year of the transaction date. At least ten transactions totaling at least two million pounds U_3O_8 are included in each calculation, or the sample time is extended as necessary to include these minima. Foreign currencies are converted to US dollars as of the transaction date.

Comments

Nuexco does not consider the following in determining the Transaction Value:

A. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.
B. The price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of Exchange Value or any other independent variable. Also excluded from consideration are all data where the delivery price is defined in such a way that it cannot currently be determined.

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[2] Transaction Values for 1976 through 1981 and their associated parameters (millions of pounds, number of transactions and number of months) are tabulated on pages 31 and 32 of Report 161.

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CURRENT MARKET DATA

CONVERSION VALUE $1.45/lb. U as UF_6
Determined as of November 30, 1982

Definition

The Conversion Value is Nuexco's judgment of the price at which spot and/or near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the last day of the month.

Derivation

Nuexco bases the Conversion Value upon:
A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Conversion Value:
A. The price of conversion services delivered or to be delivered under old contracts.
B. The price of conversion services delivered in connection with contract renegotiations or other than arm's length transactions.

LOAN USE CHARGE RATE[1] 6%
Determined as of November 30, 1982

Definition

The Loan Use Charge Rate is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the last day of the month.

Derivation

Nuexco bases the Loan Use Charge Rate upon:
A. Data from recently completed or pending loan transactions.
B. Rates included in firm proposals to borrow or lend.
C. Rates that potential borrowers and lenders have expressed as a willingness to pay or accept, but for which Nuexco is not aware of firm proposals.

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[1] Monthly data for 1968 through 1981 appear on pages 32-34 of Report 162.

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TRANSACTION SUMMARY[1]

Uranium Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current E.V.	Seller	Buyer	Remarks
2011	1983	301-600	89 (est.)	Broker	European Utility	UF_6
2021	1984-91	601-1000	indeterminate	Canadian Producer	US Utility	Price related to market. Pending required govt. approval
2023	1983-89	1001-2000	Less than 90	US Producer	US Utility	Price related to market
2025	1990-2000	2001-3000	indeterminate	African Producer	Far East Utility	Price related to market
2030	1983	1001-2000	92	US Utility	European Utility	UF_6
2031	mid-1980s	1001-3000	indeterminate	Canadian Producer	European Utility	Price related to market. Pending required govt. approval
2041	1983	51-100	100-102	US Producer	US Producer	
2048	1983	Less than 50	92-94	US unidentified	US Utility	
2057	1983	101-300	110	US Producer	US Producer	

Conversion Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U equivalent)	Approximate Price as Percent of Current C.V.	Seller	Buyer	Remarks

There are no conversion transactions reported this month.

Loan Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current L.U.C.R.	Lender	Borrower	Remarks
2042	1982	Less than 50	108	US Utility	US Producer	

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[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.

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CURRENT MARKET DATA

URANIUM SUPPLY
(As of 11/30/82)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8) 0 to 1 Year	Beyond 1 Year	Remarks
Available for Sale:			
ACTIVE			
1575		500 per year	Long Term
1909	1,100		UF_6
1925	500		UF_6
2020		200 per year	1983-92
2027	700		
2038	1,500		UF6
2056	1,400		UF_6
TOTAL:	5,200		
INACTIVE			
1581B		100 per year	Long Term
1610	20		
1804	615		
1805		500 per year	Long Term
1818		250 per year	Long Term
1877	100		
1928	1,000		UF_6
TOTAL:	1,735		

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[1] Measured from the date of this Report

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URANIUM DEMAND
(As of 11/30/82)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8) 0 to 1 Year	Beyond 1 Year	Remarks
Inquiries to Purchase:			
ACTIVE			
1871		250 per year	1983-86
1985	100		
1995	250		
1996		600	
2000		250	
2010		400 per year	1984-92
2014	160		
2030		1,350	1984-85
2031	1,000		UF_6
2032		200	
2042		400 per year	Long Term
2047	40		
2050	30		UF_6
2054	110		
2055	400		
2059	2,200		
2060	225		UF_6
2061	50		
2105	600		UF_6
2110		300	UF_6
TOTAL:	5,165		
INACTIVE			
1459		200 per year	Long Term
1652		200 per year	Long Term
1843	250		
1888		500 per year	Long Term
1963		50	
1966	100	200	
1999		50 per year	1985-90
2004	100		
2005		1,000	
2025		330	
TOTAL:	450		

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[1] Measured from the date of this Report.

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CURRENT MARKET DATA

CONVERSION SUPPLY
(As of 11/30/82)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U as UF_6)		Remarks
	0 to 1 Year	Beyond 1 Year	
ACTIVE			
1607	300		
1609	500	1,500 per year	Long Term
1840	130		
1936	1,000	200 per year	Long Term
2051	1,000		
TOTAL:	2,930		
INACTIVE			
1902		350	
1925	450		
2008	800	800	
TOTAL:	1,250		

CONVERSION DEMAND
(As of 11/30/82)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U as UF_6)		Remarks
	0 to 1 Year	Beyond 1 Year	
ACTIVE			
1995	220		
2058	1,400		
TOTAL:	1,620		
INACTIVE			
1594		450 per year	Long Term
1622		700	
TOTAL:			

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[1] Measured from the date of this Report.

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LOAN SUPPLY AND DEMAND
(As of 11/30/82)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8) 0 to 1 Year	Beyond 1 Year	Remarks
Available for Loan:			
ACTIVE			
1938	2,000		
2006A	600		
2036	200		
TOTAL:	2,800		
INACTIVE			
1815	1,000		UF_6
1884	600		
1910	1,000		
1931	600		
2040	500		UF_6
TOTAL:	3,700		
Inquiries to Borrow:			
ACTIVE			
1998	200	200	
2006	600		
TOTAL:	800		
INACTIVE	None		

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[1] Measured from the date of this Report

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RECENT DEVELOPMENTS

AUSTRALIA

The recently released Western Mining Corporation (WMC) preliminary EIS (Environmental Impact Statement) on Roxby Downs contained the following figures, among others:

1. For planning purposes it states annual production as 150,000 tonnes of copper; 3,000 tonnes U_3O_8; 3,400 Kg of gold and 23,000 Kg of silver. At those rates, the project would rank among the ten largest copper producers in the world.
2. Value of production could be between A$450 million and A$660 million, depending on metal prices.
3. Total project costs are given as at least A$1.4 billion. The project will require a construction workforce peaking at 3,000 and will eventually employ 2,400 people.
4. Under most optimistic assumptions, construction could begin in 1985, bringing first production in 1989. Uranium, although a byproduct, is a vital determinant to the economic viability of the project.

* * *

Inflation and high unemployment are causing the governing Liberal party to lose popularity in Australia. Over the twelve months ended in September of this year, the inflation rate averaged 12.3 percent. Unemployment has increased by one-fifth, to affect 7.8 percent of the nation's work force. Furthermore, the figure of 540,000 unemployed is expected to rise in early 1983 to nearly 700,000, equivalent to an unemployment rate of approximately 10 percent. This trend would seem to strengthen the Labor party's prospects in the next federal election, little more than a year away.

In South Australia's recent state elections, the Labor party defeated the Liberals by a three-seat margin in the lower house. The Labor party's performance in South Australia will be watched closely over the next year, especially with respect to the implementation of its recently modified policy on uranium mining and export.

As discussed in Report 168, the complicated and seemingly contradictory language of the Labor policy allows for various interpretations. A most significant aspect of the new policy is the increased latitude allowed to the party's governing officials. The party is no longer committed to repudiate export contracts and to close uranium mines. Therefore, their actions while in office in South Australia may give some indications of the ways in which the policy might be implemented if the Labor party were to come to power on the federal level. However, the results of last week's by-election indicate that the electorate may be not yet ready to entrust the government to the Labor party, despite the country's current economic difficulties.

During the South Australia campaign, the state's Labor party leader, the Hon. Mr. J.C. Bannon, pledged to allow uranium mining at Roxby Downs. Undoubtedly, his statements were influenced by the potential economic benefits that the development of Roxby Downs would bring to the state. WMC's release last month of the preliminary EIS for Roxby Downs also played a part.

Meanwhile, political infighting continues within the ranks of the Labor party over the policy changes adopted last August. Those of a more ideological persuasion continue to lobby for a return to the old hard line position which committed the Labor party to a moratorium on uranium projects and repudiation of existing contracts.

The federal executive of the Labor party turned down a proposal from the Victoria state branch to convene a special conference in order to revert to the older tougher stance. Now the Tasmanian state Labor party has joined the Victoria branch in calling for a special national conference on this issue. If two more state branches join the call, a special conference must be convened under Labor party rules. Leading members of the federal executive are in favor of uranium mining and so are 56 percent of Labor voters, according to an opinion poll three months ago.

One must remember that the development of Roxby Downs is governed by state legislation which would normally be binding on the government unless the new Labor government decided to change it. Realistically, one can assume, based on campaign pledges, that the new government will take a practical approach to the importance of the Roxby Downs development for the state's economy.

* * *

The Uranium Enrichment Group of Australia (UEGA) has not yet ruled out South Australia as a possible enrichment plant site on account of Labor's election victory in that state, but the Group has acknowledged that it could not build a plant in a state whose government was opposed to such a project. UEGA will commence a worldwide study of the enrichment market next year, but seems to be in no hurry to complete it. Based on the results of the market survey, they will determine when to proceed with the planned full-scale feasibility study.

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CANADA

SMDC announced that the Canadian government has approved SMDC sales contracts totaling 14.5 million pounds U_3O_8. The press release stated that "SMDC's share of the Key Lake project is largely committed through 1986 and is approximately 75 percent committed for the period from the startup until 1990." This would presumably mean that SMDC has commitments for 75 percent of their half interest in Key Lake's planned capacity of 12 million pounds per year, or 4½ million pounds U_3O_8 per year. If the press release statement were based on a different capacity figure, the actual quantity involved would be proportionately different.

Based upon public information, arithmetic, and some educated guesses (and no confidential information whatsoever), the SMDC sales situation out of Key Lake shapes up as indicated in Table 1.

Table 1

SMDC SALES COMMITMENTS FROM KEY LAKE
(thousands of pounds U_3O_8 equivalent)

Approved Contracts	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**
Sydkraft (Sweden)	325	325	325	325	325	325	325	325
SSPB (Swedish State Power Board)	710	710	710	710	710	710	710	710
Yankee Group (US)			200	400	400	400	400	400
Commonwealth Edison (US)	1,000	1,000	1,000	1,000				
Other (Non-US)	500	800	800	800	800	800	800	800
Under Negotiation								
US Buyers	400	400	400	400	400	400	400	400
TOTAL	2,935	3,235	3,435	3,635	2,635	2,635	2,635	2,635

Obviously, Table 1 shows only part of the picture. There must be other commitments that are not shown. The other two Key Lake partners have also made substantial sales in the neighborhood of 2 to 3 million pounds per year from Key Lake production. All of these sales have been concluded by the partners in the last three years.

* * *

Correction

Last month's Report (#171) section on Canada contained two errors. We stated that "SMDC acquired its existing interests in the Key Lake and Cluff Lake deposits" under the Saskatchewan mandatory participation regulations. SMDC's interests were actually acquired prior to the implementation of those regulations, which are, in any event, now repealed.

The second error involves the payment of provincial taxes and royalties by government entities such as Eldorado and SMDC. We mistakenly assumed that as government entities they would "pay neither taxes nor royalties to the province." This is incorrect. All uranium producers in Saskatchewan, including Eldorado subsidiaries and SMDC, pay royalties to the province. Eldorado does not pay Provincial Corporate Income Taxes and SMDC does not pay Federal Corporate Income Taxes. Private corporations pay both. Crown corporations, provincial corporations, and private corporations are all taxed somewhat differently, but each pays a variety of taxes and duties. Since they are taxed differently, it can be argued that one has an advantage over the other, but neither seems to have a significant advantage and there is no reason to believe that the province suffers a financial loss because of Eldorado or SMDC's presence as uranium producers in the province.

It has been widely known and reported in the province that Saskatchewan's Minister of Energy and Mines had a strong preference for private sector uranium development and objected to Eldorado's recent purchase of the Gulf Minerals property and facilities in Saskatchewan. This objection was apparently not for financial, but for philosophical reasons.

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RECENT DEVELOPMENTS

EUROPE

Utilities in the **Federal Republic of Germany** remain hopeful that the licensing of the next round of German power reactors will be aided significantly by the adoption of a standardized plant. The concept is referred to as the *"Konvoy."*

Under German law, primary responsibility for nuclear plant licensing is vested in the states. As a result, there is much duplication of bureaucracy, and a broad spectrum of regulatory results. The Konvoy concept is intended to remedy this situation. All the plants involved in the Konvoy would be identical, i.e., 1300 MWe class (PWRs) pressurized water reactors manufactured by Kernkraftwerk Union (KWU). In addition, the secondary sides would be identical, to the extent possible. The states involved in the licensing would agree beforehand that only one review for all the plants involved would take place. The state regulatory authorities would then divide the workload *by function*, not by individual plant. For example, the officials in Bavaria would not focus particularly on the Isar Unit, which is located there, but would instead handle one safety or environmental aspect of licensing for all the Konvoy plants.

The final agreements among the states, the utilities, and the manufacturers involved are not yet in place, although indications thus far appear promising. The timing of the final implementation will probably depend on whether there is a federal election called in March 1983, whether the election will take place at its normally scheduled time of late 1984. If the election were held earlier than scheduled, its results would also be a factor.

The ruling coalition of the Christian Democrats and the Free Democrats assumed power in the autumn of 1982 as a result of a Parliamentary transition, the first in the history of the Federal Republic of Germany (FRG). The coalition had previously stated its intention to hold an early election to allow the public to ratify the transition. However, there are now indications this might not happen.

The Christian Democratic Party is thought to be generally pro-nuclear, and its continued presence in power would probably enhance the prospects for adoption of the Konvoy concept.

Table 2 lists the plants which might be included in the Konvoy plan. Isar Unit 2 and Lingen will probably be the first in the schedule. Neckar Unit 2 will also very likely be a Konvoy unit; it has just been awarded the third *first-part construction permit* to be issued in the FRG since late July of this year. Wyhl is also a possibility; Biblis C will likely be included if the need for power in the RWE (Rheinisch-Westphaelisches Elektrizitaetswerk) system allows for a new nuclear plant to be built on a schedule comparable to the other plants in the Konvoy. The Hamm and Brokdorf units are also possibilities for inclusion if the states involved go along with the concept, and if timely need for power is indicated.

Table 2

**POSSIBLE "KONVOY" UNITS
FEDERAL REPUBLIC OF GERMANY**

Plant	Principal Utility(s)	Planned Startup
Isar 2 (Ohu)	Bayernwerk	1988
Lingen (Emmsland)	VEW	1988
Neckar 2	GKN	1990
Wyhl (Sued)	Badenwerk/EVS	1990
Biblis C	RWE	1990
Hamm (Uentrop)	VEW	1990
Brokdorf	NWK/PREAG	1990

* * *

France has agreed to replace the US as the supplier of enriched uranium for India's Tarapur nuclear station. France has, in effect, taken the place of the US under the 1963 agreement, which the US could no longer honor since the enactment of the Nuclear Nonproliferation Act of 1978.

For nearly four months the French had tried unsuccessfully to impose the London Nuclear Suppliers' Club's supplementary controls. India has agreed in writing to use French nuclear materials and their byproducts for peaceful purposes, but it is difficult to see how this can be enforced. Further, the question of what safeguards apply after 1993 when the contract runs out has been left pending subject to further talks.

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RECENT DEVELOPMENTS

FAR EAST

Japan

Annual price negotiations between Japanese utilities and their principal overseas uranium suppliers are beginning with a view towards being completed by mid-1983. Depending on the particular supplier, these negotiations relate either to 1983 or 1984 deliveries. Those negotiating with respect to 1983 delivery prices include ERA (Energy Resources of Australia) and Queensland Mines from Australia, Denison from Canada, Uranex from France and OURD from Niger. Those negotiating for 1984 delivery prices include NUFCOR from South Africa and the RTZ group comprising Rossing from Namibia, Mary Kathleen from Australia, and Rio Algom from Canada.

It seems likely, and in fact is reported, that the negotiations will be difficult this year with the Japanese seeking sharply lower prices based on a number of factors including: the well-recognized oversupply situation; the sharply lower spot prices that prevailed during 1982; and lower utility earnings. The mid-year financial reports of Kansai show profitability down 62 percent compared to a year ago and, for Shikoku, down 13 percent for a comparable period. The unfavorable (from the Japanese viewpoint) movement of the yen-to-US dollar exchange rate is also suggested as another factor supporting a price reduction.

Although 1982 delivery prices (negotiated in 1980 and 1981) are in the range of US$ 35.00 to 40.00, the opening Japanese position this year could well be as low as $25.00. The suppliers can be expected to resist such an extreme downward adjustment and argue that the collapse of spot market prices in 1982 was an anomaly caused by inventory liquidations, which should have no bearing on the appropriate prices for long-term supply arrangements with primary producers. Final settlement prices will, nevertheless, be influenced to some degree by the course of the spot market in the months ahead and the supplier view that, regardless of market developments, US$30 is an *absolute* minimum.

The Ministry of International Trade and Industry (MITI) continues to evaluate the Japanese uranium stockpile situation. The factors being evaluated as part of the study indicate an interest in enhancing the national security by assuring that uranium in their possession will be sufficient to overcome the effects of contract breach, trade embargoes, force majeure or balance of payment disputes. The impetus for the study is prompted by the present market price for uranium and uranium services.

Korea

The Korean government has established the organization for a fuel fabrication company. The company, whose major positions will be filled from Korea Electric and the Korea Atomic Energy Research Institute, will investigate the licensing of various fabrication processes along with the technology for local production of various fuel components.

UNITED STATES

The House of Representatives has rejected the proposed US uranium import embargo by a vote of 241-148. The embargo measure had been attached to the compromise NRC authorization bill, which had lacked only House approval before being sent to President Reagan for signature. The embargo amendment fell short of approval by 20-30 votes, but once its defeat was assured, some Representatives voted against it so as to avoid offending the Reagan administration, which had strongly opposed the embargo.

The NRC authorization bill, intact except for the embargo amendment, will probably go back to the Senate for its approval. It would be very difficult to convene another House-Senate conference committee this late in the "lame-duck" session of Congress, so the embargo issue is almost certainly dead, at least until the next session. To reopen the issue then would mean starting over with a new piece of legislation.

Supporters of the embargo have raised the possibility that Senator Domenici, its primary legislative proponent, might try to force his colleagues to support the embargo in exchange for his support for administration efforts to relax federal controls on uranium mill wastes.

It is not yet clear what impact the House defeat of the embargo amendment will have on the uranium market. On one hand, it could dash the hopes of producers and like-minded utilities for the production of ample supplies of domestic uranium by a government-protected US uranium industry. In that event, much of the recent upward pressure on uranium prices might dissipate. On the other hand, the *threat* of an embargo may have the same effect on prices as the *enactment* of one might have done. Under that scenario, US producers would adopt tough negotiating postures and US utilities would have an acceptable rationale for accepting higher prices for domestic production. In that case, a two-tier pricing system could result. In either event, the issue is likely to remain uncertain for some months to come.

* * *

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RECENT DEVELOPMENTS

During November, US utilities cancelled three nuclear units—Virginia Electric & Power Company's North Anna Unit 3 and Duke Power Company's Cherokee Units 2 and 3. Those cancellations had long been expected, however, so they will have no significant impact on forecasts of uranium demand or prices.

Cincinnati Gas & Electric (CG&E) suffered a more serious setback when the NRC ordered the utility to stop all safety-related work on the Zimmer unit. The project had been plagued with problems, but with construction nearly complete, the unit had been expected to enter commercial operations by 1984. In order to meet the NRC conditions for lifting the stop-work order, CG&E has begun negotiations to hire Bechtel as co-manager of the project. This latest development could very well delay the unit's commercial operating date by a year or more. Each year of delay represents a loss of uranium consumption of approximately 250-300 thousand pounds U_3O_8.

* * *

The NRC issued three licenses during November:

1. To Southern California Edison, a fuel loading and low-power license for San Onofre Unit 3.
2. To Pennsylvania Power & Light, a full-power operating license for Susquehanna Unit 1, a 1,060 MWe BWR.
3. To South Carolina Electric & Gas, a full-power operating license for its Summer unit, a 900 MWe PWR. Operations will be limited to 50 percent power until Westinghouse has completed a retrofit to correct steam generator vibrations; that is scheduled to be finished by mid-1983.

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URANIUM: The Market and Market Decisions

As we address the status of the nuclear power industry as it relates to the supply of uranium, we can identify a set of challenges that will require even closer cooperation between our respective government and business sectors.

The international uranium market has a few characteristics which differentiate it from other commodities. First, there is only one commercial use of uranium. Secondly, the market participants (the producers and the users) are relatively small in number and easily identifiable. Thirdly, the supply and demand sectors of the market have different time constants. These three aspects of the uranium market often make the dynamics of supply and demand more strongly and readily felt. At the same time, because there are only a few transactions taking place (usually less than ten per month), the market lacks the stabilizing influence that would characterize the market if a large number of transactions took place each month.

During the 1960s and 1970s, expected high electrical load growth in many nations led to a large number of nuclear plant orders. These future uranium users were anxious to contract for their anticipated uranium requirements. There was concern that there might not be sufficient uranium available in the earth's crust. The price per pound of uranium in 1973 was $6.00, and by 1978 the price had increased to over $43.00 per pound U_3O_8.

The uranium price rise and the forecast demand spurred exploration and development activity, leading to the discovery of large, relatively high-grade uranium deposits in Canada, Australia and Central Africa. It soon became apparent that the availability of uranium would not be crucial in the competition between nuclear and fossil fired plants.

However, the anticipated uranium consumption fell short of projections. Many electric utilities incurred ten- to fifteen-year delays in nuclear power plant construction. As a result, today's large uranium inventories began accumulating.

Reduced load growth underlay decisions to delay and even cancel nuclear power plants. For many years, United States electric utilities had planned generating facilities based on a forecast of an approximate 7 percent annual load-growth increase. An annual increase in demand of about 3 percent has proven to be closer to reality. In contrast, TAIPOWER has experienced a much higher load growth in the recent past and a corresponding recent decline to near zero. Expectations are that it will again increase as the current worldwide recession eases.

No new nuclear power plants have been ordered in the US since 1978. During the past 7 years, over 60 nuclear power plant cancellations, representing approximately 60,000 MWe, have been announced. Several times that number have been substantially delayed, with many still indefinitely deferred.

In July of this year, TAIPOWER announced the government's decision to defer indefinitely the construction of planned nuclear units 7 and 8. The deferral was attributed to lowered forecasts of electric power demand. Even France, which has perhaps the most ambitious nuclear program in the world, has slowed their future program.

Thus, Free World uranium consumption is constantly falling short of the levels anticipated several years ago. However, most utilities are committed to purchasing uranium under long-term contracts and, as a result, are holding large inventories of U_3O_8, natural UF_6 and enriched UF_6. Free World electric utility inventories and national stockpiles now amount to about 5.5 years of forward consumption. This inventory position compares to a Free World desired inventory of about 2.5 to 3 years of forward consumption. Based on Nuexco projections, the Free World inventory balance will not improve for quite some time.

Demand can't be stimulated quickly; neither is it likely that supply will be reduced quickly. The inertia in the uranium industry combined with the start-up of new low-cost production centers means that much more uranium will be produced than will be consumed over the next several years, even though some of the higher cost producers will cease production.

The consumption picture cannot be expected to improve in the near future. Consumption can be reduced quickly as a result of cancellations and deferrals, but consumption increases have a long lead time due to the approximate ten-year regulatory and construction period for new nuclear plants.

As would be expected, the price of uranium has dropped substantially over the last few years. Uranium spot prices have declined by more than 40 percent in the last twenty-four months.

Over the past several years, the price decline has been accentuated by the inventories which have been offered for sale by inventory holders. Utility sales from inventory accounted for about 40 percent of 1981 spot and

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near-term uranium sales. Offers to sell by utilities averaged about 50 percent of all market offerings in the last six months of 1981.

For the past two years, the presence of this inventory on the spot and near-term market has contributed to the imbalance in uranium supply and demand and the market's general instability. During the first six months of 1982, the ratio of near-term supply to demand moved from approximately two-to-one to approximately sixteen-to-one. Supply and demand have become more balanced recently, because some sellers are retreating from aggressive sales positions. The inventory has not gone away and the fact that the inventory sellers may re-emerge at any time keeps the market in a state of unstable equilibrium.

Not only is inventory in the form of U_3O_8 being offered for sale, but utilities have been able to change already enriched and converted material into the more salable form of U_3O_8. This is done by means of creative transactions which allow a utility to sell the enrichment or conversion component of their uranium so that they are left with the simpler form of U_3O_8 to resell into the near-term market. When sold, a pound of 3% enriched material displaces about 14 pounds of U_3O_8 demand. A continuation of these "de-conversions" and "de-enrichments" will maintain the downward pressure on the spot market price.

The price trend of the past few years raises questions with respect to future market action and timing for the uranium user. There are mainly three types of forces at work in procurement decisions: economic, financial and political.

1. *Economic forces* are reflected in the price of uranium. The crucial question to a uranium buyer is one of timing: If one waits to contract for uranium, will the price go down; or, should one purchase now?

2. *Financial forces* are based upon the buyer's financial picture: The buyer will be very sensitive to the price of the uranium, the interest carrying charge, and the financial condition of his company.

The primary duty of the utility company—namely, to provide reliable service—dictates a strategy of risk avoidance. Risk avoidance translates into a desire to purchase uranium at market price, at the appropriate time. In this way, the utility avoids public criticism for paying more than the prevailing price at the time of delivery.

3. *Political and legal forces* are usually not under the control of the purchasing entity. A utility must operate within the regulations and guidelines determined by its government entity.

It is typical within the uranium industry to be very concerned with the economics of the industry. However, it is simply a partial consideration in the decision-making process. The financial, political and legal considerations are at least as important as the economic factors.

Security of supply considerations are evident at some point in all procurement decisions. Some nations, because of their political position, are more sensitive to supply assurance than others. These buyers will be expected to be less price sensitive in order to compensate for increased security of uranium supply.

The economic, financial and political factors are all tied into the decision to procure uranium and each will be given a different degree of importance by different purchasers. The decision to buy involves the condition of the market at any one time, the financial condition of the buyer and the perceived reliability of the supplier. Thus, it is not surprising that uranium contracting is often a long decision-making process and that the varying considerations are only infrequently determined to be favorably aligned.

From my point of view (that of a Broker), I judge that the market is approaching a bottom of the price cycle and will remain low for some time into the future. Thus, in this period of relative price stability, greater consideration could be directed toward the financial, political and legal questions.

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FORECAST OF URANIUM PRODUCTION

Introduction

This Report presents Nuexco's latest forecasts of uranium production for the world outside Communist areas (WOCA). Those forecasts are quantified in Tables 3, 4 and 5. Table 3 summarizes Nuexco's forecast of US production of U_3O_8 for centers operating or planned as of September 30, 1982. Table 4 shows Nuexco's forecast of world U_3O_8 production by region; Table 5 contains the same production estimates segmented according to status of the production center.

Production centers are divided into categories, according to stage of development, as follows:

1. Operating production centers—those which have shipped U_3O_8 in commercial quantities on or before September 30, 1982.

2. Production centers under construction—those which were being built as of September 30, 1982, and which have an established access to ore reserves. Conventional production centers are included in this category only if mill construction has actually begun.

3. Planned production centers—those for which firm development and construction commitments had been made as of September 30, 1982, and which Nuexco believes will be economically viable based on Nuexco's most recent price forecast.

United States

The forecast detailed in Table 3 calls for US production of U_3O_8 this year to fall between 25 and 26 million pounds U_3O_8, a *one-third decline* since 1981. Furthermore, the forecast calls for a decline of fully 43 percent next year, so that forecast 1983 production is only 14.7 million pounds U_3O_8. That level is barely one-third the 1980 peak of almost 43 million pounds U_3O_8. Beyond 1983, the forecast calls for the US to maintain an annual production rate of approximately 12-13 million pounds U_3O_8 through 1990, before rising by 30 to 40 percent in 1991.

Nuexco's previous forecast called for US production rates to decline gradually to 13 million pounds by 1991. The substantial downward revision detailed in Table 3 is a direct result of US producers' dramatic reactions to the sustained price decline of the past four years. Declining ore grades, depletion of orebodies and high costs all played a part, but it is the reduced market prices which have forced so many US producers out of production. Other factors important to the forecast are:

1. Nuexco's belief that US utilities will not be willing to subsidize high-cost US producers by paying a substantial premium for US-origin U_3O_8.

2. Nuexco's belief that the US government will not erect barriers to the importation of large quantities of uranium, up to two-thirds of annual *unfilled* requirements of US utilities. A proposed US uranium import embargo has just been rejected by the House of Representatives, primarily because of vigorous opposition by the Reagan administration.

Table 3

US URANIUM PRODUCTION FORECAST
(millions of pounds U_3O_8)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Operating										
Conventional Mills	17.6	9.0	7.2	8.4	7.2	7.2	7.6	7.6	7.8	8.9
Unconventional Sources	6.3	5.7	4.8	4.0	4.6	3.8	3.8	4.0	3.6	4.0
Subtotal	23.9	14.7	12.0	12.4	11.8	11.0	11.4	11.6	11.4	12.9
Planned (as of September 30, 1982)	0	0	0	0	0.5	1.0	1.0	1.0	2.0	4.0
Shut Down 1982 (as of September 30, 1982)	2.0	0	0	0	0	0	0	0	0	0
TOTAL	25.9	14.7	12.0	12.4	12.3	12.0	12.4	12.6	13.4	16.9

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Table 4

WORLD URANIUM PRODUCTION FORECAST[1]

(millions of pounds U_3O_8)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Australia	13.1	11.3	12.3	12.3	13.3	11.2	10.0	10.0	10.0	12.0
Canada	18.5	19.7	24.5	25.3	28.6	30.0	31.0	31.0	30.8	30.8
Central Africa[2]	11.7	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
France	5.9	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Namibia	10.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Republic of South Africa	15.6	16.7	17.2	16.8	16.8	17.2	17.2	17.1	17.1	17.5
Other Nations[3]	2.0	3.0	3.0	3.6	4.4	4.4	4.2	3.9	3.9	3.5
Non-US Total	77.3	75.7	82.0	83.0	88.1	87.8	87.4	87.0	86.8	88.8
US[4]	25.9	14.7	12.0	12.4	12.3	12.0	12.4	12.6	13.4	16.9
TOTAL (rounded)	103	90	94	95	100	100	100	100	100	106

[1] Outside Communist areas
[2] Niger and Gabon
[3] Argentina, Belgium, Brazil, Chile, Mexico, Portugal, Spain and others
[4] This report, Table 3

Table 5

WORLD URANIUM PRODUCTION FORECAST[1]

(millions of pounds U_3O_8)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Operating										
US[2]	25.9	14.7	12.0	12.4	11.8	11.0	11.4	11.6	11.4	12.9
Non-US	76.6	72.5	73.1	73.4	74.8	74.5	73.2	73.2	73.0	75.7
Subtotal	102.5	87.2	85.1	85.8	86.6	85.5	84.6	84.8	84.4	88.6
Under Construction										
US	0	0	0	0	0	0	0	0	0	0
Non-US	0.7	3.2	8.9	9.6	13.3	13.3	14.2	13.8	13.8	13.1
Subtotal	0.7	3.2	8.9	9.6	13.3	13.3	14.2	13.8	13.8	13.1
Planned										
US	0	0	0	0	0.5	1.0	1.0	1.0	2.0	4.0
Non-US	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	0.5	1.0	1.0	1.0	2.0	4.0
TOTAL (rounded)[3]	103	90	94	95	100	100	100	100	100	106

[1] Outside Communist areas
[2] Includes facilities shut down during 1982
[3] Any inconsistencies between this table and Table 3 are due to rounding.

WOCA

The forecast detailed in Table 4 calls for WOCA uranium production to total approximately 103 million pounds in 1982, down somewhat from the 1981 level of approximately 112 million pounds U_3O_8. The forecast calls for the total to decline sharply in 1983, to 90 million pounds U_3O_8, and then to maintain a pattern of approximately 100 million pounds U_3O_8 per year (within 5 percent) for the remainder of the ten-year forecast period. At approximately 12-13 million pounds per year through 1990, US production will represent only about *one-eighth* of the WOCA total.

The reasons behind Nuexco's forecast of declining US production, briefly discussed in this article, have been detailed in previous Reports. However, the reasons for other producers' ability to maintain production under the same market conditions bear repeating. The reasons include:

1. Most producers in the rest of the world have long-term contracts calling for negotiated prices, so the continuing decline in spot market prices has affected them more slowly and to a lesser extent than in the US.

2. Outside the US, these effects were for a time limited to a few commercial producers of uranium, as opposed to captive producers. That trend is changing, but the nature of captive relationships is that the seller and buyer have various common interests. Thus, price negotiations with a captive producer are seldom truly arms-length, so the commercial producers would feel the effects of price declines first and strongest.

3. Some older non-US production facilities can be expected to phase out due to the same pressures of high cost and low grade which affect US producers, but the resulting decreases in production will be more than offset by new production from high-grade reserves in Canada and Australia.

4. Production arising from facilities captive to aggressive national nuclear power programs will also help to offset the forecast decline in US production. Active promotion of nuclear power by the governments of several nations allows them to use longer planning horizons than their US counterparts. Additionally, much of the important production outside the US is dedicated to attaining and sustaining national self-sufficiency in the nuclear fuel cycle, at least in nuclear raw materials. For these reasons, much of what might otherwise be excess or economically marginal uranium production outside the US will continue in operation.

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COST OF ENRICHED URANIUM (US $ per KgU as UF_6, 3 percent U_{235}) FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS (0.20% TA)

Feed Cost (US $ per KgU as Natural UF_6)	SWU Price (US $ per SWU)								
	90	95	100	105	110	115	120	125	130
40	606.75	628.29	649.82	671.35	692.88	714.42	735.95	757.48	779.01
45	634.15	655.68	677.22	698.75	720.28	741.81	763.35	784.88	806.41
50	661.55	683.08	704.61	726.15	747.68	769.21	790.74	812.28	833.81
55	688.95	710.48	732.01	753.54	775.08	796.61	818.14	839.67	861.20
60	716.34	737.88	759.41	780.94	802.47	824.01	845.54	867.07	888.60
65	743.74	765.27	786.81	808.34	829.87	851.40	872.93	894.47	916.00
70	771.14	792.67	814.20	835.73	857.27	878.80	900.33	921.86	943.40
75	798.53	820.07	841.60	863.13	884.66	906.20	927.73	949.26	970.79
80	825.93	847.46	869.00	890.53	912.06	933.59	955.13	976.66	998.19
85	853.33	874.86	896.39	917.93	939.46	960.99	982.52	1,004.06	1,025.59
90	880.73	902.26	923.79	945.32	966.86	988.39	1,009.92	1,031.45	1,052.99
95	908.12	929.66	951.19	972.72	994.25	1,015.79	1,037.32	1,058.85	1,080.38
100	935.52	957.05	978.59	1,000.12	1,021.65	1,043.18	1,064.72	1,086.25	1,107.78
105	962.92	984.45	1,005.98	1,027.52	1,049.05	1,070.58	1,092.11	1,113.65	1,135.18
110	990.32	1,011.85	1,033.38	1,054.91	1,076.45	1,097.98	1,119.51	1,141.04	1,162.57
115	1,017.71	1,039.25	1,060.78	1,082.31	1,103.84	1,125.37	1,146.91	1,168.44	1,189.97
120	1,045.11	1,066.64	1,088.18	1,109.71	1,131.24	1,152.77	1,174.30	1,195.84	1,217.37
125	1,072.51	1,094.04	1,115.57	1,137.10	1,158.64	1,180.17	1,201.70	1,223.23	1,244.77
130	1,099.90	1,121.44	1,142.97	1,164.50	1,186.03	1,207.57	1,229.10	1,250.63	1,272.16
135	1,127.30	1,148.83	1,170.37	1,191.90	1,213.43	1,234.96	1,256.50	1,278.03	1,299.56
140	1,154.70	1,176.23	1,197.76	1,219.30	1,240.83	1,262.36	1,283.89	1,305.43	1,326.96
145	1,182.10	1,203.63	1,225.16	1,246.69	1,268.23	1,289.76	1,311.29	1,332.82	1,354.36
150	1,209.49	1,231.03	1,252.56	1,274.09	1,295.62	1,317.16	1,338.69	1,360.22	1,381.75
155	1,236.89	1,258.42	1,279.96	1,301.49	1,323.02	1,344.55	1,366.09	1,387.62	1,409.15
160	1,264.29	1,285.82	1,307.35	1,328.89	1,350.42	1,371.95	1,393.48	1,415.02	1,436.55

OPTIMUM TAILS ASSAY FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS

(percent U_{235})

Feed Cost (US$ per KgU as Natural UF_6)	SWU Price (US $ per SWU)																
	90	95	100	105	110	115	120	125	130	138.65	140	149.85	160	170	180	190	200
40	.316	.322	.327	.333	.338	.343	.347	.352	.356	.363	.364	.372	.379	.385	.391	.397	.402
45	.302	.308	.314	.320	.325	.330	.334	.339	.343	.350	.351	.359	.366	.373	.379	.384	.390
50	.291	.297	.302	.308	.313	.318	.323	.327	.332	.339	.340	.347	.354	.361	.367	.373	.379
55	.280	.286	.292	.297	.302	.307	.312	.317	.321	.328	.329	.337	.344	.351	.357	.363	.368
60	.271	.277	.282	.288	.293	.298	.302	.307	.311	.319	.320	.327	.334	.341	.347	.353	.359
65	.262	.268	.273	.279	.284	.289	.294	.298	.302	.310	.311	.318	.326	.332	.339	.345	.350
70	.254	.260	.265	.271	.276	.281	.285	.290	.294	.301	.302	.310	.317	.324	.330	.336	.342
75	.246	.252	.258	.263	.268	.273	.278	.282	.287	.294	.295	.302	.310	.316	.323	.329	.334
80	.239	.245	.251	.256	.261	.266	.271	.275	.279	.287	.288	.295	.302	.309	.316	.322	.327
85	.233	.239	.244	.249	.254	.259	.264	.268	.273	.280	.281	.288	.296	.302	.309	.315	.321
90	.227	.232	.238	.243	.248	.253	.258	.262	.266	.274	.275	.282	.289	.296	.302	.308	.314
95	.221	.227	.232	.237	.242	.247	.252	.256	.260	.268	.269	.276	.283	.290	.296	.302	.308
100	.216	.221	.227	.232	.237	.242	.246	.251	.255	.262	.263	.270	.278	.284	.291	.297	.302

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COST OF ENRICHED URANIUM (US $ per KgU as UF_6, 3 percent U_{235}) FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS (0.20% TA)

Feed Cost (US $ per KgU as Natural UF_6)	SWU Price (US $ per SWU)							
	138.65	140	149.85	160	170	180	190	200
40	816.26	822.08	864.50	908.21	951.27	994.34	1,037.40	1,080.47
45	843.66	849.48	891.89	935.60	978.67	1,021.73	1,064.80	1,107.86
50	871.06	876.87	919.29	963.00	1,006.07	1,049.13	1,092.20	1,135.26
55	898.46	904.27	946.69	990.40	1,033.46	1,076.53	1,119.59	1,162.66
60	925.85	931.67	974.09	1,017.80	1,060.86	1,103.93	1,146.99	1,190.06
65	953.25	959.06	1,001.48	1,045.19	1,088.26	1,131.32	1,174.39	1,217.45
70	980.65	986.46	1,028.88	1,072.59	1,115.66	1,158.72	1,201.79	1,244.85
75	1,008.84	1,013.86	1,056.28	1,099.99	1,143.05	1,186.12	1,229.18	1,272.25
80	1,035.44	1,041.26	1,083.67	1,127.39	1,170.45	1,213.51	1,256.58	1,299.64
85	1,062.84	1,068.65	1,111.07	1,154.78	1,197.85	1,240.91	1,283.98	1,327.04
90	1,090.24	1,096.05	1,138.47	1,182.18	1,225.24	1,268.31	1,311.37	1,354.44
95	1,117.63	1,123.45	1,165.87	1,209.58	1,252.64	1,295.71	1,338.77	1,381.84
100	1,145.03	1,150.85	1,193.26	1,236.97	1,280.04	1,323.10	1,366.17	1,409.23
105	1,172.43	1,178.24	1,220.66	1,264.37	1,307.44	1,350.50	1,393.57	1,436.63
110	1,199.83	1,205.64	1,248.06	1,291.77	1,334.83	1,377.90	1,420.96	1,464.03
115	1,227.22	1,233.04	1,275.46	1,319.17	1,362.23	1,405.30	1,448.36	1,491.43
120	1,254.62	1,260.43	1,302.85	1,346.56	1,389.63	1,432.69	1,475.76	1,518.82
125	1,282.02	1,287.83	1,330.25	1,373.96	1,417.03	1,460.09	1,503.16	1,546.22
130	1,309.41	1,315.23	1,357.65	1,401.36	1,444.42	1,487.49	1,530.55	1,573.62
135	1,336.81	1,342.63	1,385.04	1,428.76	1,471.82	1,514.88	1,557.95	1,601.01
140	1,364.21	1,370.02	1,412.44	1,456.15	1,499.22	1,542.28	1,585.35	1,628.41
145	1,391.61	1,397.42	1,439.84	1,483.55	1,526.61	1,569.68	1,612.74	1,655.81
150	1,419.00	1,424.82	1,467.24	1,510.95	1,554.01	1,597.08	1,640.14	1,683.21
155	1,446.40	1,452.21	1,494.63	1,538.34	1,581.41	1,624.47	1,667.54	1,710.60
160	1,473.80	1,479.61	1,522.03	1,565.74	1,608.81	1,651.87	1,694.94	1,738.00

OPTIMUM TAILS ASSAY FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS

(percent U_{235})

Feed Cost (US$ per KgU as Natural UF_6)	SWU Price (US $ per SWU)																
	90	95	100	105	110	115	120	125	130	138.65	140	149.85	160	170	180	190	200
105	.211	.216	.222	.227	.232	.236	.241	.245	.250	.257	.258	.265	.272	.279	.285	.291	.297
110	.206	.211	.217	.222	.227	.231	.236	.240	.245	.252	.253	.260	.267	.274	.280	.286	.292
115	.201	.207	.212	.217	.222	.227	.231	.236	.240	.247	.248	.255	.262	.269	.275	.281	.287
120	.197	.202	.208	.213	.218	.222	.227	.231	.235	.242	.243	.250	.258	.264	.271	.277	.282
125	.193	.198	.204	.209	.213	.218	.222	.227	.231	.238	.239	.246	.253	.260	.266	.272	.278
130	.189	.194	.200	.205	.209	.214	.218	.223	.227	.234	.235	.242	.249	.256	.262	.268	.273
135	.185	.191	.196	.201	.205	.210	.214	.219	.223	.230	.231	.238	.245	.251	.258	.264	.269
140	.182	.187	.192	.197	.202	.206	.211	.215	.219	.226	.227	.234	.241	.247	.254	.260	.265
145	.178	.184	.189	.194	.198	.203	.207	.211	.215	.222	.223	.230	.237	.244	.250	.256	.261
150	.175	.180	.185	.190	.195	.199	.204	.208	.212	.218	.219	.227	.234	.240	.246	.252	.258
155	.172	.177	.182	.187	.192	.196	.200	.204	.208	.215	.216	.223	.230	.237	.243	.248	.254
160	.169	.174	.179	.184	.188	.193	.197	.201	.205	.212	.213	.220	.227	.233	.239	.245	.251

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THE SWANSON OREBODY

Introduction

In July of this year, Marline Uranium Corporation announced the discovery of a significant uranium deposit six miles northeast of Chatham in Pittsylvania County, Virginia. A preliminary study indicates that this deposit, named the Swanson Orebody, contains about 30,000,000 pounds of U_3O_8 in ore reserves where average grade exceeds four pounds per ton. The study also identified large quantities of lower grade ore.

Marline was initially attracted to the southeastern United States by Precambrian geology along the Appalachian Piedmont. After initial field reconnaissance surveys in the summer of 1977, exploration efforts were concentrated in the vicinity of the northeast-southwest trending Triassic Basin. Additional surveys were conducted before leasing started in the fall of 1978 along the western boundary of the Danville Triassic Basin. The radiometric anomaly representing the Swanson deposit was identified in March 1979 during an airborne scintillometer survey on land already leased by Marline. Ore grade samples were collected from weathered outcrop in a ditch at the discovery site. Shortly thereafter the magnitude of the radiation anomaly was outlined as a result of detailed ground and airborne radiometric surveys. Defining the ore reserves of the Swanson deposit required the drilling of holes totaling over 124,000 feet. Figure 1 shows the location of the Swanson uranium deposit with relation to the Triassic geology.

Setting

The area of the Swanson Deposit is typical of the Virginia Piedmont characterized by rounded hills with local relief usually less than 150 feet. The climate is mild and annual rainfall averages about 43 inches, evenly distributed throughout the year. Average temperature ranges from about 5 degrees C in January to 25 degrees C in July, with extremes ranging from -18 degrees C to 40 degrees C.

Land use is largely agriculture and timber with a population of approximately 23 persons per square mile. The main crops are tobacco, corn, soybeans, and hay. Livestock is largely limited to beef and dairy cattle.

Surface Exploration Methods

Early exploration by Marline was primarily reconnaissance in nature. Autoborne surveys along public roads were made using Scintrix GIS-3 gamma-ray spectrometers, and Scintrex GBS-1 and McPhar TC-33 scintillometers mounted inside cars. Limited stream sediment, soil and soil radon measurements were made using an INAX-531 radon counter. These early efforts were successful in locating a number of radiometric anomalies along the western edge of the Danville Triassic Basin.

In central Virginia almost all rural land is privately owned. Access to land for any significant ground surveys requires leasing the mineral rights for exploration and mining. In 1978, Marline started leasing land in central Pittsylvania County, Virginia. Marline presently has exploration and mining leases on approximately 53,000 acres scattered along the Danville Triassic Basin.

With some land leased and the knowledge that significant mineralization was present, Marline did extensive airborne surveys in 1979. These surveys were done using a Bell 206-B Jet Ranger Helicopter carrying an Exploranium/GeoMetrics GR-800A four-channel differential gamma ray spectrometer with a sensor crystal volume of 1024 cubic inches. In addition, a Totem 1A VLF electromagnetic detector, manufactured by Hertz Industries, was mounted in a 20-pound bird towed 30 feet below the helicopter. The main terrain clearance was 175 feet and survey lines were one-quarter mile apart. The radiometric portion of the airborne survey worked very well, but the VLF data was virtually useless because of cultural interference such as power lines, fences and pipelines.

On the ground, detailed radiometric surveys over the Swanson Deposit were made using a four-channel gamma ray spectrometer (GeoMetric GR-310). Survey lines were one hundred feet apart and readings were taken at 20 foot intervals. Geochemical analysis of soil samples from reading stations were utilized to support the results of radiometric surveys. Uranium mineralization covered by barren rock and soil was not detected by the radiometric surveys.

A number of instruments have been used for ground geophysical surveys over the Swanson deposit. The best geophysical response was achieved using a PPM-300 field magnitometer synchronized to a PPM-400 digital base station magnitometer, both manufactured by EDS Instruments. The survey lines were 200 feet apart with readings taken at 50 foot intervals. This survey was supplemented by a gravity survey along selected lines using a La Costa-Romberg instrument. Radiation readings were taken at all magnitometer reading sites using a Urtec UG-130 gamma ray scintillometer.

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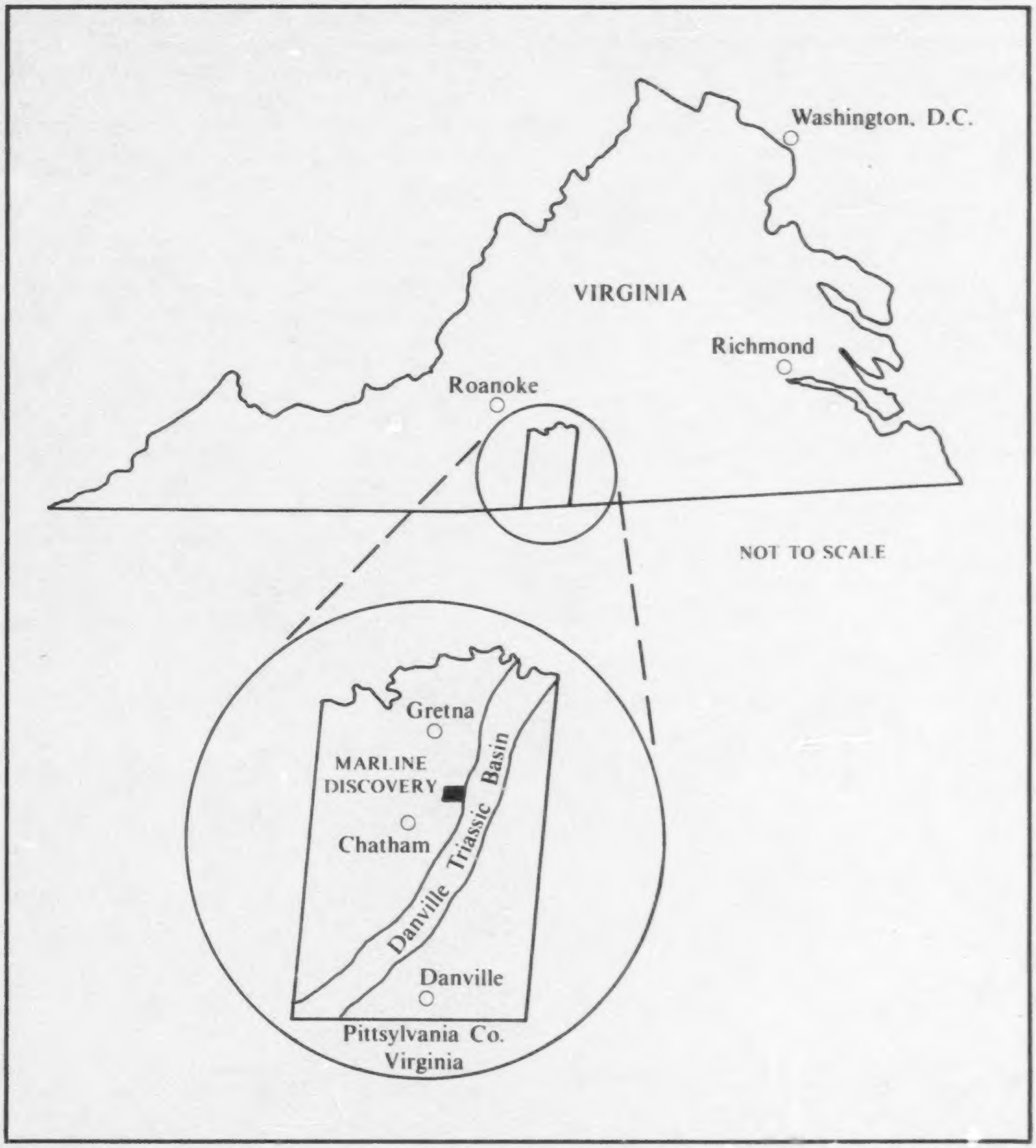
Washington, D.C.
VIRGINIA
Richmond
Roanoke
NOT TO SCALE
Gretna
MARLINE DISCOVERY
Chatham
Danville Triassic Basin
Danville
Pittsylvania Co.
Virginia

Figure 1

LOCATION OF THE SWANSON URANIUM DEPOSIT, PITTSYLVANIA COUNTY, VA.

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Geology

Uranium mineralization is associated with a shear zone adjacent to a major regional structure referred to as the Chatham Fault. The fault forms the western boundary of the Danville Triassic Basin (Figure 2). The indurated cataclastics along the Chatham Fault are unmineralized, as are the downfaulted Triassic rocks immediately to the east. The rocks which almost exclusively host the uranium mineralization consist of augen gniess of the Fork Mountain Formation, which is determined to be Precambrian-Lower Paleozoic in age. Minor quantities of mineralization occur in the Leatherwood Granite of Ordovician age where the granite is adjacent to the main ore zone. Pitchblende is the principal uranium mineral present. Isotopic lead-lead age dates of pitchblende indicate the age of uranium mineralization at just over 400 million years.

Uranium mineralization is exposed at the surface as a result of extensive erosion; however, a major part of the orebody plunges under a mantle of barren Fork Mountain Formation in a south-southeasterly direction as shown in Figure 3. The extent of deep mineralization, to date, has not been determined, but drill hole information shows mineralization extending below 1000 feet.

Two major categories of uranium mineralization have been encountered to date:

1. Disseminated uranium minerals, primarily discrete crystals of pitchblende, dispersed within the granulated groundmass of the preferred host rocks.

2. Colloform and crystalline uranium oxide minerals implaced within narrow, but abundant, calcite/quartz bearing veins and fractures. These veins and fractures generally crosscut the zones of disseminated mineralization. Therefore, they apparently constitute a later stage of mineralization.

The orebody as shown in Figure 3 is somewhat tabular and up to 500 feet wide. Since it crops out at the surface, the initial mining will be by open pit methods with, perhaps, underground methods used later. Stripping ratios will be low. Other uranium reserves in the vicinity of the Swanson deposit will require additional evaluation to determine if they can be mined economically. At this point there has been no preproduction development beyond exploration. The land over the orebody is presently returned to farm crop production.

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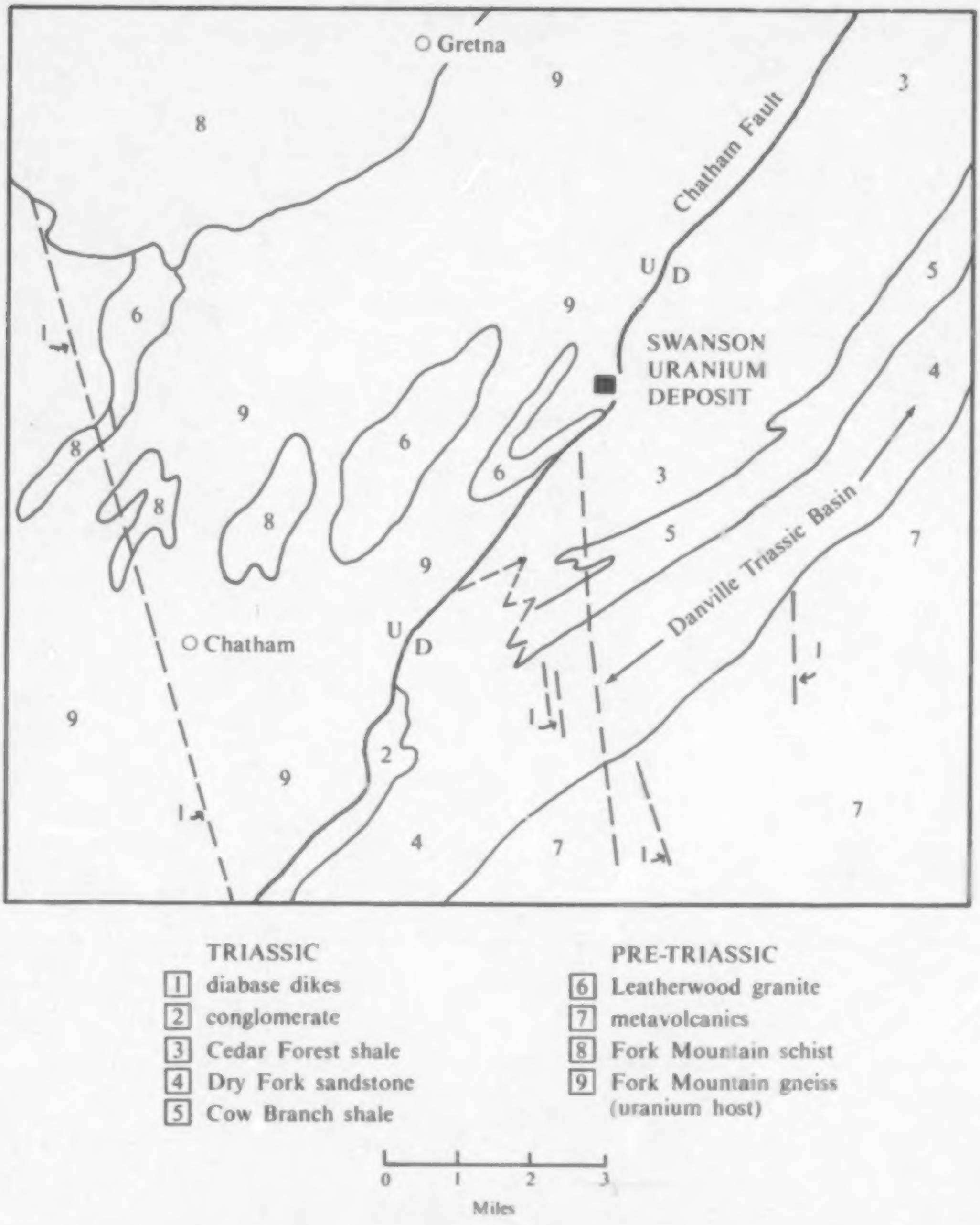
Gretna
9
3
8
Chatham Fault
U
D
5
9
SWANSON
URANIUM
DEPOSIT
4
6
9
8
6
6
3
8
8
5
9
Danville Triassic Basin
7
U
D
Chatham
1
1
1
9
2
9
7
1
4
7
1
TRIASSIC
1 diabase dikes
2 conglomerate
3 Cedar Forest shale
4 Dry Fork sandstone
5 Cow Branch shale
PRE-TRIASSIC
6 Leatherwood granite
7 metavolcanics
8 Fork Mountain schist
9 Fork Mountain gneiss (uranium host)
0
1
2
3
Miles

Figure 2

GEOLOGIC MAP
GENERAL VICINITY OF THE SWANSON URANIUM DEPOSIT

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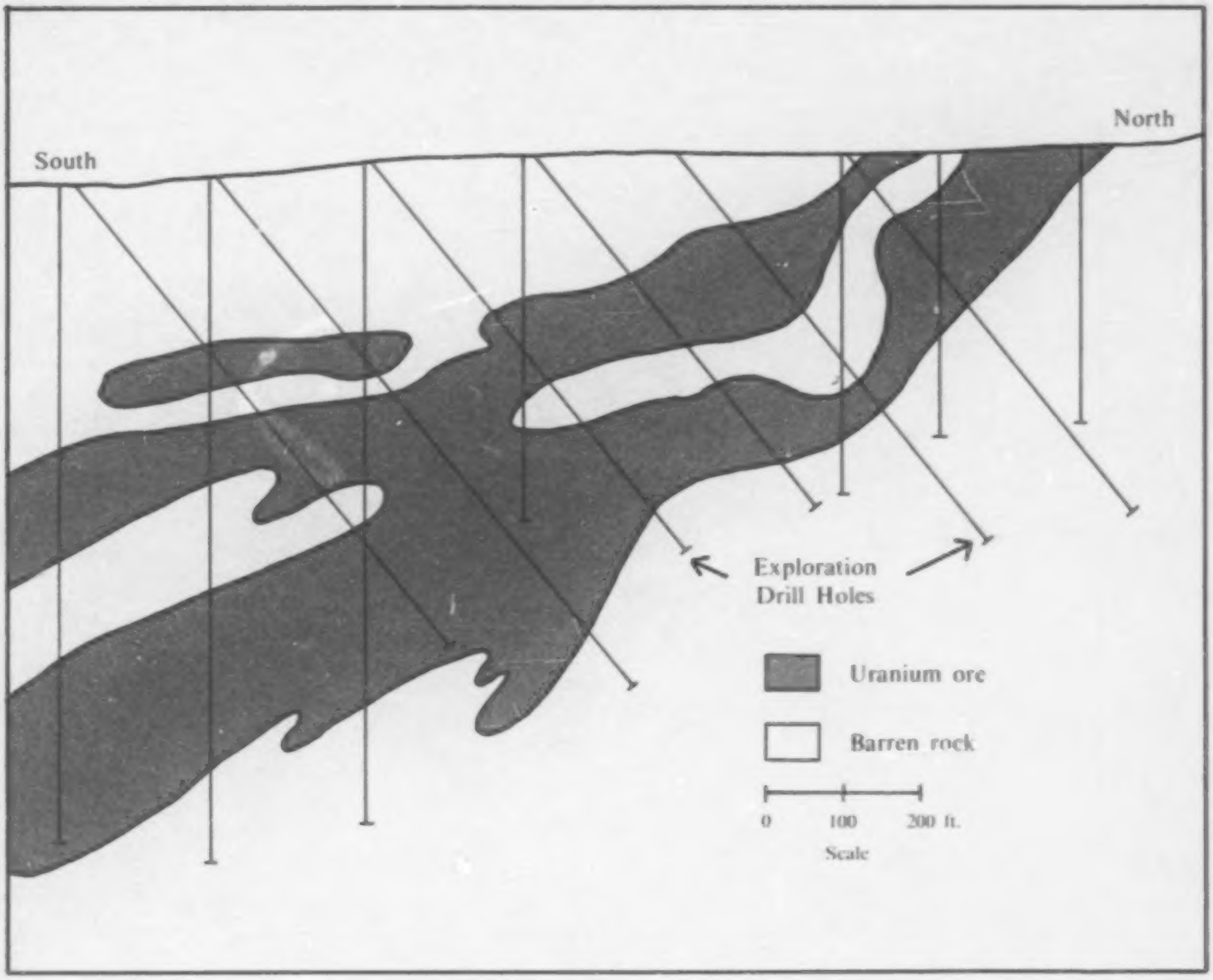
South
North
Exploration
Drill Holes
Uranium ore
Barren rock
0
100
200 ft.
Scale

Figure 3

GENERALIZED NORTH-SOUTH CROSS-SECTION THROUGH THE SWANSON URANIUM DEPOSIT

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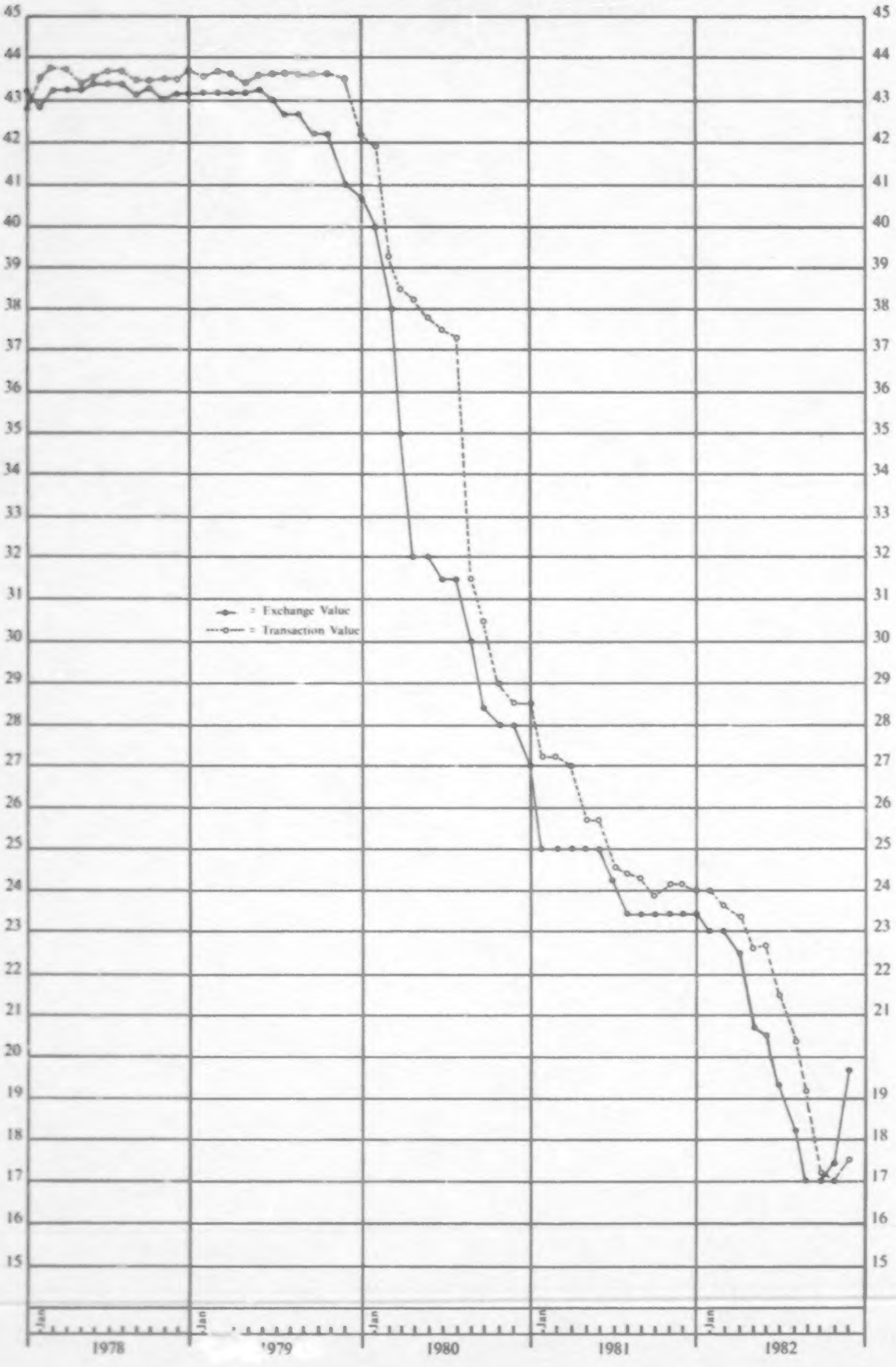
EXCHANGE AND TRANSACTION VALUES
SINCE JANUARY 1978

Determined as of the last day of the month indicated



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HISTORICAL MARKET DATA

HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	**19.75**	

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	**17.55**	

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country	per lb. U_3O_8 in Concentrates	per kg U_3O_8 in Concentrates	per kg U in Concentrates
US (dollar)	19.75	43.54	51.35
France (franc)	138.99	306.41	361.33
FRG (mark)	49.13	108.31	127.73
Japan (yen)	4,957	10,929	12,888
Switzerland (franc)	42.26	93.16	109.85
UK (pound)	12.27	27.04	31.89
Australia (dollar)	20.66	45.55	53.72
Canada (dollar)	24.55	54.13	63.83
Niger, Gabon (CFA)	6,954	15,331	18,079
South Africa (rand)	21.93	48.35	57.02
Sweden (kroner)	147.17	324.45	382.60

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[1] Calculated using currency exchange rates published in the Wall Street Journal on November 30, 1982.

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AUSTRALIAN GOVERNMENT STATISTICS

	Price Index of Materials Used in Manufacturing Industry—All Groups (Year 1968-69 = 100.0)[1]	Weighted Average Minimum Weekly Wage Rates—Adult Males Australia Mining and Quarrying (A$)[2]
Annual Avg. 1971[3]	101.5	65.95
Annual Avg. 1972[3]	105.6	71.26
Annual Avg. 1973[3]	124.4	78.96
Annual Avg. 1974[3]	141.9	108.07
Annual Avg. 1975[3]	150.4	132.55
Annual Avg. 1976[3]	168.4	160.93
Annual Avg. 1977[3]	192.0	179.03
Annual Avg. 1978[3]	198.5	190.04
Annual Avg. 1979	248.8	196.34
Annual Avg. 1980	321.8	218.00
Annual Avg. 1981	355.3	237.34
Jun 1981	360.4	237.93
Jul 1981	356.9	237.86
Aug 1981	359.9	237.86
Sep 1981	357.4	238.00
Oct 1981	351.6	239.26
Nov 1981	351.3	241.31
Dec 1981	349.9	258.56
Jan 1982	354.9	261.58
Feb 1982	356.7	262.95
Mar 1982	360.3	263.12
Apr 1982	367.7	262.99
May 1982	367.6	263.24
Jun 1982	367.2	264.23R
Jul 1982	369.1	272.38R
Aug 1982	371.5P	272.23
Sep 1982	374.1P	—

P = Preliminary   R = Revised since last month

---

[1] Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0), Table 3.

[2] Australian Bureau of Statistics, Canberra: "Wage Rates, Australia" (Catalogue No. 6312.0), Table 1. Figures for the latest fourteen months shown are subject to revision.

[3] Monthly data for 1970 through 1978 appear on pages 4.7 and 4.8 of Nuexco Report 138.

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GOVERNMENT STATISTICS

CANADIAN GOVERNMENT STATISTICS

	Industry Selling Price Index: Manufacturing (D 500000)[1] [2] (1971 = 100.0)	Wage-earner Data: Average Hourly Earnings (C$)[3] [4]		
		Metal Mining, including Milling (SIC 050-059)	Primary Metal Industries, non-ferrous (SIC 296-298)	Chemicals and Chemical Products (SIC 370-379)
Annual Avg. 1978	190.4	8.76	6.82	6.97
Annual Avg. 1979	217.9	9.60	7.35	7.67
Annual Avg. 1980	247.2	10.59	8.05	8.50
Annual Avg. 1981	272.3P	12.02	9.03	9.53
Sep 1981	276.9	12.47	9.22	9.77
Oct 1981	279.3	12.78	9.35	9.91
Nov 1981	278.8	12.89	9.45	9.89
Dec 1981	280.0	12.87	9.42	10.03
Jan 1982	281.9	13.14	9.53	10.11
Feb 1982	283.5	13.25	9.60	10.19
Mar 1982	284.8R	13.34	9.62	10.35
Apr 1982	287.6R	13.46	9.79	10.48
May 1982	289.0R	13.56	9.88	10.62
Jun 1982	290.0R	13.71P	9.92P	10.69P
Jul 1982	290.7R	13.67P	10.05R	10.72R
Aug 1982	290.5R	13.50P	10.31P	10.77P
Sep 1982	292.4	—	—	—

P = Preliminary   R = Revised since last month

---

[1] Statistics Canada, Prices Division, Ottawa; "Industry Price Indexes" (Catalogue 62-011), Table 1. Indexes for the most recent six months shown are subject to revision.

[2] Monthly data for 1973 through 1978 appear on page 4.10 of Nuexco Report 138.

[3] Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa; "Employment, Earnings and Hours" (Catalogue 72-002), Table 2.

[4] Monthly data for 1977 and 1978 appear on page 4.11 of Nuexco Report 138.

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REPUBLIC OF SOUTH AFRICA STATISTICS

	Average Declared Working Costs per Metric Ton of Gold Ore Milled (Rand)[1]	Consumer Price Index[2] (1975 = 100, except where otherwise indicated)	Producer[5] Price Index All Groups (1975 = 100)	Total Employment in Mining and Quarrying (Code 35)[7]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand) (Code 40)[7]
Annual Avg. 1971[3]	7.88	106.4[4]	59.1	652,294	415,956
Annual Avg. 1972[3]	8.79	113.3[4]	63.9	623,067	443,933
Annual Avg. 1973[3]	10.51	124.1[4]	72.3	684,743	572,133
Annual Avg. 1974[3]	13.18	138.5[4]	85.3	674,140	761,596
Annual Avg. 1975[3]	16.71	157.2[4]	100.0	639,473	1,003,617
Annual Avg. 1976[3]	19.30	174.7[4]	115.1	671,240	1,212,983
Annual Avg. 1977[3] [6]	23.87	194.4[4]	130.0	712,006	1,420,670
Annual Avg. 1978[3] [6]	27.14	137.2	142.7	664,571	1,537,169
Annual Avg. 1979[3] [6]	30.18	155.3	164.5	692,209	1,830,632
Annual Avg. 1980[6]	35.53	176.7	192.1	714,379	2,279,615
Annual Avg. 1981	41.89	206.5R	218.3	728,506	2,820,505
May 1981	—	197.7	213.2	726,869	219,880
Jun 1981	40.41	200.0	215.3	728,506	237,049
Jul 1981	—	204.6	218.4	735,839	249,080
Aug 1981	—	208.0	222.6	722,684	245,817
Sep 1981	43.28	211.6	224.6	724.604	251,502
Oct 1981	—	213.4	227.0	717,918	248,159
Nov 1981	—	214.8	229.4	720,255	253,044
Dec 1981	44.52	216.3	230.4	709,612	257,655
Jan 1982	—	217.6	233.1	700,375	257,173
Feb 1982	—	220.2	236.8	705,992	250,191
Mar 1982	45.49	225.2	237.4	725,700	262,210
Apr 1982	—	228.9	241.9	707,502	252,562
May 1982	—	230.3	244.8	715,162	258,770
Jun 1982	45.77	232.1	246.7	707,552	261,361
Jul 1982	—	234.1	249.4	702,141	283,248
Aug 1982	—	236.8	253.4	705,562	276,730
Sep 1982	48.04	241.0	255.0	704,490	276,730
Oct 1982	—	243.9	260.1	—	281,331

---

[1] Chamber of Mines of South Africa, Johannesburg; "Analysis of Working Results," published quarterly.
[2] Republic of South Africa Department of Statistics, Pretoria; "Government Gazette: Consumer Price Index for Urban Areas."
[3] Historical data for the Average Declared Working Costs and Consumer Price Index 1970-1979 appear on page 4.9 of Nuexco Report 140.
[4] April 1970 = 100.00.
[5] Previously known as the WHOLESALE PRICE INDEX, now the PRODUCER PRICE INDEX. The computation remains the same.
[6] Historical data for Codes 35 and 40 1977-1980 appear on page 28 of Nuexco Report 157.
[7] Bulletin of Statistics, Department of Statistics, Pretoria.

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GOVERNMENT STATISTICS

US GOVERNMENT STATISTICS

	Producer Price Index— Industrial Commodities (1967 = 100)[1]	Producer Price Index— All Commodities (1967 = 100)[1]	Consumer Price Index (1967 = 100)[2]	GNP Implicit Price Deflator (1972 = 100)[3]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[4]			
					Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
Annual Avg. 1971[5]	114.1	114.0	121.3	96.01	4.12	4.15	3.97	3.49
Annual Avg. 1972[5]	117.9	119.1	125.3	100.00	4.56	4.59	4.26	3.71
Annual Avg. 1973[5]	125.9	134.7	133.1	105.75	4.84	4.98	4.51	3.91
Annual Avg. 1974[5]	153.8	160.1	147.7	115.08	5.44	5.63	4.88	4.21
Annual Avg. 1975[5]	171.5	174.9	161.2	125.79	6.13	6.24	5.39	4.64
Annual Avg. 1976[5]	182.4	183.0	170.5	132.34	6.76	6.87	5.91	4.96
Annual Avg. 1977[5]	195.1	194.2	181.5	140.05	7.28	7.67	6.43	5.39
Annual Avg. 1978[5]	209.4	209.3	195.4	150.42	8.23	8.56	7.02	5.82
Annual Avg. 1979[5]	236.5	235.6	217.4	163.42	9.27	9.50	7.60	6.32
Annual Avg. 1980[5]	274.8	268.8	246.8	178.64	10.26	10.63	8.30	6.94
Annual Avg. 1981	304.1	293.4	272.4	195.51	11.55	11.98	9.12	7.62
Oct 1981	309.0	296.1	279.9	—	12.08	12.44	9.37	7.80
Nov 1981	309.3	295.5	280.7	—	12.12	12.48	9.42	7.83
Dec 1981	310.0	295.8	281.5	201.55	12.08	12.45	9.53	7.90
Jan 1982	311.7	298.2	282.5	—	12.19	12.66	9.68	7.98
Feb 1982	311.4	298.5	283.4	—	12.22	12.61	9.68	7.96
Mar 1982	311.0	298.0	283.1	203.68	12.29	12.69	9.71	8.01
Apr 1982	309.9	298.0	284.3	—	12.23	12.68	9.81	8.03
May 1982	309.6	298.6	287.1	—	12.25	12.71	9.83	8.05
Jun 1982	310.6R	299.3R	290.6	205.98	12.26	12.91	9.95	8.09
Jul 1982	313.0P	300.6P	292.2	—	12.23	12.91	10.02	8.18
Aug 1982	313.4P	300.4P	292.8	—	12.29R	12.97	10.03R	8.24
Sep 1982	312.9P	299.5P	293.3	208.38R	12.39P	13.43P	10.21R	8.32P
Oct 1982	314.4P	299.9P	294.1	—	—	—	10.26P	8.36P

P = Preliminary R = Revised since last month

[1] US Bureau of Labor Statistics, Washington, D.C.; "Producer Prices and Price Indexes," Table 6 (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents.

[2] US Bureau of Labor Statistics, Washington, D.C.; Consumer Price Index for All Urban Consumers, US City Average, All Items.

[3] US Department of Commerce, Washington, D.C.; Bureau of Economic Analysis, National Income and Wealth Division; "Survey of Current Business," Table A. The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted.

[4] US Bureau of Labor Statistics, Washington, D.C.; "Employment and Earnings," Table C-2. All data based on 1972 revision of SIC Manual. Data for 1970-1976 are adjusted to the March 1977 benchmark. Data for 1977-1978 are adjusted to the March 1979 benchmark. Data for January 1979 and beyond are adjusted to the March 1980 benchmark.

[5] Monthly data 1970-1978 for Producer Price Index-Industrial Commodities, Consumer Price Index, and Employment and Earnings SIC codes 10, 333, and 28, and quarterly data for GNP Implicit Price Deflator appear on pages 4.6-4.8 of Nuexco Report 139.
Monthly data 1977-1978 for Employment and Earnings SIC Codes 10, 333, and 28 appear on page 33 of Nuexco Report 147.
Monthly data 1970-1978 for Employment and Earnings SIC Code 36 appear on page 23 of Nuexco Report 154.
Monthly data 1979-1980 for Employment and Earnings, Revised Establishment Data, all listed codes, appear on page 22 of Nuexco Report 158.
Monthly data 1977-1980 for Producer Price Index-All Commodities, appear on page 21 of Nuexco Report 158.

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JANUARY 1983 NUMBER 173

Monthly Report on the Nuclear Fuel Market

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NUEXCO REPORT 173
EXECUTIVE SUMMARY

1982 Annual Review: Part 1 of 2

Part 1 of Nuexco's **Annual Review** features a discussion of price behavior in 1982 for natural uranium and conversion. Also, important developments in Canada and the United States are reviewed. Next month, Part 2 will feature a review of secondary SWU market developments in 1982. It will also review important market developments that took place in Africa, Australia, Europe and the Far East.

Exchange Value Rose $0.50, to $20.25

The **Exchange Value** as of December 31, 1982 is **$20.25** per pound U_3O_8. Nine uranium sales are reported, involving more than 17 million pounds U_3O_8 equivalent. Five long-term transactions accounted for 87% of the total.

Near-term Supply-Demand Ratio is 2.3:1

Active sellers in the zero to one year time frame are offering 8.8 million pounds U_3O_8, up 70% from 5.2 million pounds last month. After spot and near-term transactions representing more than two million pounds were concluded during December, *active uranium demand* dropped to 3.9 million pounds U_3O_8 as of the end of the month, a 25% decline since last month. Therefore, the supply-demand ratio increased to 2.3:1.

Transaction Value Jumped $1.25, to $18.80

The **Transaction Value** as of December 31, 1982 is **$18.80** per pound U_3O_8. It includes 17 transactions totaling 5.7 million pounds U_3O_8 and covers a period of three months.

Conversion Value Unchanged at $1.45

The **Conversion Value** as of December 31, 1982 is **$1.45** per pound U as UF_6, unchanged from last month. One conversion transaction is reported. Active sellers are offering 2.6 million pounds U as UF_6 in near-term conversion services, down slightly since last month. Active demand fell to 220 thousand pounds U as UF_6, one-fifth last month's level. The decrease was due to the departure of one potential buyer for a large quantity.

Loan Use Charge Rate Steady at 6%

The **Loan Use Charge Rate** as of December 31, 1982 is **6 percent** per annum. One transaction is reported.

Enriched Uranium and SWUs

Although a number of 3.5-year DOE Requirements contract holders are seeking secondary market supplies for FY 1983, Nuexco is not presently aware of any sellers willing to offer prices low enough to make contract terminations attractive. The prevailing discount for DOE FY 1983 SWU remains at approximately $25. Sellers of DOE SWU for delivery in FY 84 continue to offer discounts of $28-$30 from DOE's AFC price (at .2 tails). The market for DOE SWU for FY 1985 and later has virtually disappeared while potential sellers await DOE's announcement of the terms and conditions of conversion to the FR contract.

Analysis & Commentary

Nuexco's latest forecast of Apparent Future Consumption indicates that the Free World is presently consuming uranium at the rate of approximately 70 million pounds U_3O_8 per year. That rate is forecast to reach 100 million pounds by 1987.

A supply-demand analysis based on Nuexco's latest forecasts indicates that the worldwide uranium industry is on the verge of achieving intermediate-term to long-term stability.

Raw Materials

Reviews US producer activities of 1982.

1982 Index

Will be printed next month.

This Executive Summary may be reproduced for internal distribution.

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NUEXCO REPORT 173
FIGURES OF THE MONTH

	This Month	Last Month	12 Months Ago
	(Referenced to December 31, 1982)		
Exchange Value[1]	20.25	19.75	23.50
Transaction Value[1]	18.80	17.55	24.00
Conversion Value[2]	1.45	1.45	1.20
Loan Use Charge Rate[3]	6%	6%	6%
Near-Term Uranium Supply[4]	8.8	5.2	8.8
Near-Term Uranium Demand[5]	3.9	5.2	4.3
Near-Term Supply-Demand Ratio	2.3	1.0	2.0
Current Transactions[6]:			
Number of Transactions	9	9	10
Quantity of Material[7]	8.7-22.4	6.1-12.1	2.3-4.9
USDOE SWU Prices[8]:			
AFC	138.65	138.65	130.75
Requirements	149.85	149.85	127.59
Optimum Tails Assay[9]	.327	.329	.305
Calculated Price of Enriched UF_6[10] [11]:			
2.5 w/o U_{235}	698.99	693.19	709.04
3.0 w/o U_{235}	903.04	895.97	912.30
3.5 w/o U_{235}	1,111.24	1,102.91	1,119.48
4.0 w/o U_{235}	1,322.50	1,312.91	1,329.55

---

[1] US $ per pound U_3O_8 equivalent
[2] US $ per pound U as UF_6
[3] Per annum
[4] Active inquiries to sell, for delivery within 12 months after contract signing (millions of pounds U_3O_8)
[5] Active inquiries to purchase, for delivery within 12 months after contract signing (millions of pounds U_3O_8)
[6] Uranium transactions only; does not include loans, conversion, or SWU transactions
[7] Millions of pounds U_3O_8, equivalent
[8] US $ per SWU
[9] Percent U_{235}.
[10] Theoretical calculation based on Exchange Value, Conversion Value, 0.20 percent tails assay and the USDOE price for AFC SWUs.
[11] US $ per KgU as UF_6

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NUEXCO

MONTHLY REPORT ON THE URANIUM MARKET

January 1983 No. 173

R. WESLEY MILLER, *EDITOR*

PRICING

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COST OF 3% ENRICHED URANIUM

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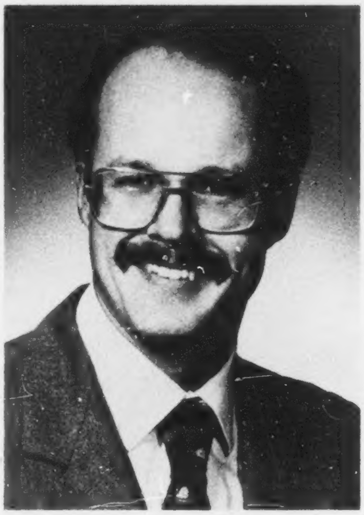
FOREWORD

We are pleased to announce that **Mr. Donald W. Radcliffe** joined Nuexco this month as a Fuel Cycle Consultant. Don will assist Dick Andersen in expanding Nuexco's consulting activities.

Don was previously employed at General Electric in the Nuclear Energy Business Group, where he was a Senior Fuel Program Manager. Don has had many years of experience working with the electric utility industry in marketing nuclear fuel, developing fuel requirements, improving license procedures, introducing improved fuel designs and negotiating contracts. He holds a Bachelor of Science Degree in Engineering from the California Institute of Technology and a Masters Degree in Mechanical Engineering from the University of California at Berkeley.



On December 21, Nuexco's New York office moved to Stamford, Connecticut. The new address is:

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*Until the new telex is installed, customers may send telexes to **Ken McCue, Scott Hickman** and **Terry Lindsay** via our Menlo Park office. The number is: 470674 (NUEXCO UI).

* * *

The following report is now available from Nuexco: "Uranium: World Market Study and Price Forecast: 1982 to 1996." The study presents a detailed analysis of Uranium:

Consumption
Production
Inventories
Unfilled Requirements
Uncommitted Production
Production Costs
Spot Market Price Forecast

Five cases are analyzed for the period 1982 to 1996, including scenarios based on the effects of different international policies and political developments.

For further information, please contact Dick Andersen in our headquarters office.

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PRICING

NATURAL URANIUM AND CONVERSION

December 1982

The **Exchange Value** as of December 31, 1982 is **$20.25** per pound U_3O_8, up $0.50 since last month. Buying activity was once again quite vigorous; the *Current Market Data* section lists nine uranium sales transactions, involving more than 17 million pounds U_3O_8 equivalent. The five long-term transactions accounted for approximately 87 percent of that amount, while four spot or near-term transactions accounted for the balance.

* * *

Active uranium supply (material offered at competitive prices, terms and other conditions) amounts to **8.8 million pounds U_3O_8** equivalent in the near term, an increase of 3.6 million pounds over last month's level of 5.2 million. After spot and near-term transactions representing more than two million pounds U_3O_8 were concluded during the month of December, **active uranium demand** for spot or near-term delivery dropped to **3.9 million pounds U_3O_8** equivalent, a 25 percent decrease. Therefore, the **supply-demand ratio** increased to 2.3:1.

The **Transaction Value** as of December 31, 1982 is **$18.80** per pound U_3O_8, up $1.25 from a month ago. The current Transaction Value includes 17 transactions totaling 5.7 million pounds U_3O_8 and covers a period of three months. Because the Transaction Value is still being influenced by transactions reported in October, when prices were substantially lower, it still lags the current Exchange Value somewhat.

* * *

The **Conversion Value** as of December 31, 1982 is **$1.45** per pound U as UF_6, unchanged from last month. **Active offers to sell conversion services** in the near term amount to approximately **2.6 million pounds U as UF_6**, a ten percent decrease. **Active conversion demand** dropped to **220 thousand pounds U as UF_6**, one-fifth last month's level. All of the decrease was due to the exit of one potential buyer for a large quantity. One substantial conversion transaction is reported in the *Current Market Data* section.

* * *

The **Loan Use Charge Rate** remained at six percent per annum. The limited activity in the market is at or near that level, but there are very few participants. Although one loan transaction reported in the *Current Market Data* section occurred at approximately 6½ percent, there are still significant quantities of material available for loan at the level of the current Loan Use Charge Rate.

* * *

During December, an observable, but difficult to quantify, spread developed between the different transactions which took place and, even more so, between bids and offers. On the one hand, US producers seem to be demanding a premium, perhaps 5 percent, for *US-origin* uranium in the form of *concentrates*. On the other hand, buyers outside the US seem to be willing to accept any one of several origins and any one of several forms of uranium in order to obtain the best price. Complicating this situation is the fact that buyers who would prefer US-origin concentrates do not yet seem to be indicating a willingness to pay the premiums being demanded by US producers.

1982 Annual Review

Summary

For the worldwide uranium market, 1982 brought an end, at least temporarily, to a price decline that had persisted for more than three years. In fact, the first eight months of the year saw the Exchange Value fall by $6.50, to a recent low of $17.00 on August 31 (and September 30), 1982. That constituted a 28 percent decline from its December 31, 1981 level of $23.50. By the end of the year, the Exchange Value had regained half of its loss, rebounding to $20.25, a level 14 percent below that of a year ago. Table 1 lists the Exchange Value for each month in 1982.

The Price Decline

The Exchange Value ended 1981 at $23.50 per pound U_3O_8, having been at that level for six months. Prices appeared to have bottomed. However, renewed and aggressive selling developed as a result of several factors, including cancellations and delays of nuclear facilities, continued overproduction, growing inventories, high interest rates and litigation. The January 31, 1982 Exchange Value dropped to $23.00, setting in motion a sustained 28 percent decline, which saw the Exchange Value reach $17.00 by the end of August.

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Table 1

1982 EXCHANGE VALUES, CONVERSION VALUES, AND LOAN USE CHARGE RATES

Determined as of the Last Day of the Month Indicated	Report Number	Exchange Value[1] (per lb. U_3O_8)	Conversion Value[2] (per lb. U_3O_8)	Loan Use Charge Rate[3] (per annum)
January	162	$23.00	$1.20	6%
February	163	$23.00	$1.20	6%
March	164	$22.50	$1.20	6%
April	165	$20.75	$1.20	6%
May	166	$20.50	$1.00	6%
June	167	$19.25	$1.00	6%
July	168	$18.25	$1.00	6%
August	169	$17.00	$0.90	6%
September	170	$17.00	$1.10	6%
October	171	$17.50	$1.60	6%
November	172	$19.75	$1.45	6%
December	173	$20.25	$1.45	6%

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[1] Defined on page 8 of this Report. Historical data are reprinted in each Monthly Report.
[2] Defined on page 8 of this Report. Historical Conversion Values are tabulated in this Report, Table 5.
[3] Defined on page 9 of this Report. Historical Loan Use Charge Rates for 1968-1981 appeared in Report 162 on pages 32-34.

Several factors contributed to last January's resumption of the price decline.

1. Transactions had recently been concluded at lower price levels.
2. Lower prices were being negotiated in pending transactions.
3. Buyers and sellers perceived that recent cancellations and deferrals of reactors would make available for sale, in the near term, additional large quantities of inventory.
4. As expected, the amount of material available for sale in the near term did increase, peaking in July at nearly 18 million pounds U_3O_8 equivalent.

Aware of these developments and sensing a weakening market, buyers became increasingly selective, particularly in the spot and near-term markets. Some buyers who had been active in the market delayed their purchasing. At the same time, sellers trying to anticipate the trend entered the market with substantial quantities of material.

Table 2 lists the monthly uranium supply, demand and supply-demand ratios for 1982. Although those figures do not correspond directly to changes in Exchange Value, they can help somewhat to interpret the reasons behind spot or near-term price movements.

For the first six to nine months of 1982, the uranium market was characterized by the willingness of a few particularly aggressive sellers to cut prices as much as necessary to sell their material. At least eight different market participants, not all at the same time, each sold during 1982 more than 1,000,000 pounds U_3O_8 for spot or near-term delivery. Sellers included utilities and producers, as well as US and non-US entities. Those sales campaigns, which appear complete, were marked by aggressive pricing and led to sales of more than 11 million pounds U_3O_8. With that sort of pressure being exerted on the spot and near-term markets, it is not surprising that the Exchange Value declined to $17.00. However, by fall of 1982, the mood of the most active sellers in the market had become one of less urgency. Resisting buyers' efforts to extract lower prices, they were showing less willingness to reduce prices in the hope of stimulating demand.

The Turnaround

After declining to $17.00 on August 31, the Exchange Value held steady until October 31, when it increased fifty cents to $17.50. That was the first increase since November 1978, four years earlier. The November 30 Exchange Value's increase of $2.25 marked the first time in *exactly five years* that the Exchange Value had increased in two consecutive months. The November 30

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Table 2

1982 SPOT AND NEAR-TERM[1] URANIUM SUPPLY AND DEMAND
(Active[2] Inquiries as Reported by Nuexco)

As of the Last Day of the Month	Report Number	Uranium Supply (Inquiries to Sell)	Uranium Demand (Inquiries to Purchase)	Supply-Demand Ratio	Exchange Value (per lb. U_3O_8)
		(millions of pounds U_3O_8, equivalent)			
January	162	10.1	4.0	2.5	$23.00
February	163	10.9	3.3	3.3	$23.00
March	164	11.2	2.2	5.2	$22.50
April	165	13.0	1.4	9.3	$20.75
May	166	15.2	1.6	9.5	$20.50
June	167	17.8	1.1	16.2	$19.25
July	168	2.6	1.0	2.6	$18.25
August	169	1.7	0.16	10.6	$17.00
September	170	3.3	0.66	5.0	$17.00
October	171	4.3	2.1	2.1	$17.50
November	172	5.2	5.2	1.0	$19.75
December	173	8.8	3.9	2.3	$20.25

[1] For delivery within one year.

[2] Nuexco began describing Inquiries as either ACTIVE or INACTIVE with the publication of Report 164. Therefore, this Table includes *all* spot and near-term inquiries to buy or sell uranium which were published in Reports 162 and 163.

Exchange Value's increase of thirteen percent was also the second largest percentage increase in history, surpassed only by one of 17 percent on December 31, 1975. Finally, the Exchange Value rose fifty cents in December, to finish the year at $20.25, only 14 percent below the level of one year ago.

Among the many reasons for the sudden reversal of the US supply-demand situation, the most obvious is the subsidence of selling pressure which several inventory holders (both utilities and producers) had been putting on the market. Earlier in the year, more than half of the total available supply might have been offered by US inventory holders. As of the end of December, the single inventory seller is offering for sale just 500 thousand pounds U_3O_8. Several other factors contributed to the turnaround.

1. By the late summer or early fall of 1982, the most aggressive sellers had largely completed sales campaigns begun earlier in the year. In the same time frame, buyers began to exhibit renewed interest in purchasing under long-term contracts at the lowered price levels. That upsurge in demand caused a dramatic recovery in the active supply-demand ratio; from an imbalanced 16.2:1 in August, it dropped to an almost ideal 1:1 as of November 30. With sellers demanding higher prices, buyers suddenly began to find a more difficult market and, in turn, had to become more aggressive to complete desired transactions. The sellers also sensed the shifted market dynamics and moved their offering levels higher.

2. The initial increase in the Exchange Value (from $17.00 to $17.50 per pound U_3O_8 on October 31) was viewed by some buyers and sellers as a signal that spot prices had bottomed and were perhaps rebounding.

3. Expectations that the proposed US uranium import limitation would be enacted may have been a contributing factor.

4. The great majority—over 90 percent at one point—of buying was being done by utilities adding to inventory which, in some cases, will not be utilized until the late 1980s or later. Such behavior suggests that those buyers believed that purchases at the current spot market price plus carrying charges would prove to be less expensive than waiting to purchase nearer time of actual use in a reactor. Those buyers were indicating their judgments that uranium prices, in constant dollars, will rise substantially in the longer term. Such inventory purchases could be expected to continue (while cash remained available at relatively favorable terms) until the spot prices began to approach the present value of expected future prices.

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5. Nuexco first noted the trend toward utility purchases for inventory in Report 162—the same report that marked the resumption of the price decline as the January 31 Exchange Value dropped to $23.00—in which we noted that: ". . . prices in the spot and near-term markets are diverging from those of the intermediate and long-term markets. Utility invitations for five- to ten-year supplies (typically beginning in the 1983-1985 time period) are unlikely to evoke sales offers at prices related to current spot market levels. To the extent that the price differential exceeds inventory carrying costs, it is possible, as in the past, that some buyers may elect to buy and hold inventory as opposed to contracting longer term. Such early procurement would, of course, tend to strengthen spot prices."

Outlook for 1983 and Beyond

Because many producers and utilities wish it to be true, there is some speculation that a sustained price recovery is underway. However, it is Nuexco's opinion that to forecast a sustained price rise would be premature at this juncture.

The psychological aspects of spot price movements are substantial and predictions as to the duration and magnitude of any particular move are usually more intuitive than objective. Nevertheless, regardless of whether they turn out to be accurate, market perceptions can be self-fulfilling *in the short term*.

For example, the prospect of a US embargo on the import of non-US origin uranium may have contributed to the recent price rise by altering the perceptions of some market participants. Anticipating that US uranium imports would be limited somehow, sellers might have been encouraged to raise their asking prices and then to hold more firmly to them. Likewise anticipating an import limitation and concurrent price rises, some buyers may have pursued one or more market opportunities more vigorously and with lessened sensitivity to price.

On the other hand, the embargo issue and the past three months' price increases may have been more a coincidence of timing than cause and effect. The embargo issue first surfaced in early 1982 when the Exchange Value was well over $20.00 per pound U_3O_8. However, the House of Representatives' decisive defeat of the proposed US uranium import embargo could have the opposite effect.

Furthermore, much of the purchasing currently taking place is discretionary, and such demand could well vanish if prices continue to rise. Utilities willing to increase inventories at what they view as bargain prices will likely withdraw if prices rise substantially above current levels. Similarly, producers who are purchasing rather than producing can and will produce when the economics of their individual "make or buy" decisions change.

For the long term, however, it would be imprudent to ignore certain basic and very powerful market factors. The inventory redistribution so necessary for an optimum balance between supply and demand is far from complete. While some utilities and producers have liquidated excess stocks, others could become sellers at any time, particularly if utilities began to receive more pressure from their regulatory authorities to carry less uranium in inventory.

The basic production-consumption equation is out of balance and gives every indication of remaining so for several more years. Production continues at a rate of 100 million pounds U_3O_8 annually and is forecast to continue at that rate for the rest of this decade. Consumption, though rising, is still only about 60 million pounds annually and is forecast to remain below production for the next five years. It is difficult to develop a case for a strong price recovery under such conditions.

Thus, while current perceptions could lead to price recovery in the near term, market participants would be advised to bear in mind those market factors that have too often been ignored in the short history of the commercial uranium market. For the short term, those are:

1. Potential for non-US inventory selling;
2. US inventory selling;
3. Production exceeding consumption;
4. Nuclear plant construction delays;
5. Reduced concern for security of supply;
6. Production cutbacks;
7. Government regulations in supplier nations;
8. Operating plant needs.

Factors that appear more relevant for the longer term are:

1. Low electrical load growth;
2. New nuclear plant orders;
3. Rich non-US ore grades and timing of production from these deposits;
4. Non-US government price controls;
5. Sustained revenues for underdeveloped nation suppliers;
6. New high-grade discoveries;
7. Production levels affected by gold prices.

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Table 3

1982 TRANSACTION VALUES[1]
(and Associated Parameters)

Determined as of the Last Day of the Month Indicated	Report Number	Transaction Value (per lb. U_3O_8)	Millions of Pounds	Number of Transactions	Number of Months
January	162	24.00	2.8	20	5
February	163	23.70	2.2	14	3
March	164	23.40	2.8	12	3
April	165	22.60	3.6	13	3
May	166	22.70	4.0	15	4
June	167	21.50	2.6	11	4
July	168	20.30	2.2	10	4
August	169	19.10	2.3	14	4
September	170	17.30	3.2	16	3
October	171	17.00	3.6	20	3
November	172	17.55	4.9	20	3
December	173	18.80	5.7	17	3

[1] Defined on page 8 of this Report. Historical Transaction Values and their associated parameters for the years 1976-1981 appeared in Report 161 on pages 31 and 32.

The **Transaction Value** lagged the Exchange Value throughout 1982. The December 31, 1981 Transaction Value of $24.00 was unchanged in the first month of this year. One month after the Exchange Value began its decline, the Transaction Value began to follow. The Transaction Value reached the same low point as the Exchange Value ($17.00), but only after the Exchange Value had been at that point for the two previous months. In fact, the Transaction Value's low point came at the same time the Exchange Value began its rise. The year ended with Transaction Value at $18.80 and rising, as transactions from earlier months, when prices were at or near their lows, are dropped out of the sample. Table 3 lists the Transaction Value and its associated parameters (which relate to sample size) for each month of 1982.

* * *

The **Conversion Value** began 1982 at $1.20 per pound U as UF_6 and held that level for four months. Then, as shown in Table 1, it dropped steadily until reaching a low of $0.90 in August. Then it rose to $1.60 and dropped back to $1.45 for the last two months of the year. Throughout the year, the secondary market for conversion services had few participants and only small quantities were traded. As a consequence, the Conversion Value was very volatile. In such a market, sometimes referred to as *thin* or *shallow*, the actions of one buyer or seller can have a disproportionate effect on prices. This factor applies to the secondary conversion market even more than it does to the uranium market. Table 4 lists spot and near-term conversion supply and demand for each month in 1982. Table 5 lists the Conversion Value for each of the 24 months that Nuexco has been publishing it.

* * *

The **Loan Use Charge Rate** remained at six percent per annum for every month in 1982. In general, there was very little activity and there were very few participants in the loan market. Table 4 lists loan supply and demand for each month in 1982.

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Table 4

1982 SPOT AND NEAR-TERM[1] CONVERSION AND LOAN SUPPLY AND DEMAND

(Active[2] Inquiries as Reported by Nuexco)

As of the Last Day of the Month	Report Number	Conversion Supply (millions of pounds U as UF_6)	Conversion Demand (millions of pounds U as UF_6)	Loan Supply (millions of pounds U_3O_8, equivalent)	Loan Demand (millions of pounds U_3O_8, equivalent)	Exchange Value (per pound U_3O_8)
January	162	2.4	0.5	2.7	1.8	$23.00
February	163	3.4	0.5	2.4	2.9	$23.00
March	164	3.1	0.6	3.0	1.3	$22.50
April	165	4.8	0.8	6.4	0.8	$20.75
May	166	4.9	0.7	8.4	0.3	$20.50
June	167	4.5	0.3	9.2	0.3	$19.25
July	168	2.8	0.7	9.2	0.3	$18.25
August	169	2.6	0.7	7.1	0.0	$17.00
September	170	1.8	0.1	4.1	0.0	$17.00
October	171	1.7	0.3	4.8	0.8	$17.50
November	172	2.9	1.6	2.8	0.8	$19.75
December	173	2.6	0.2	3.2	1.5	$20.25

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[1] For delivery within one year

[2] Nuexco began describing Inquiries as either ACTIVE or INACTIVE with the publication of Report 164. Therefore, this Table includes *all* spot and near-term conversion or loan inquiries which were published in Reports 162 and 163.

Table 5

HISTORICAL CONVERSION VALUES[1]

Determined as of the last day of the month indicated
(US dollars per pound U as UF_6)

1981	Report Number	Conversion Value	1982	Report Number	Conversion Value
January	150	1.20	January	162	1.20
February	151	1.20	February	163	1.20
March	152	1.20	March	164	1.20
April	153	1.40	April	165	1.20
May	154	1.15	May	166	1.00
June	155	1.15	June	167	1.00
July	156	1.15	July	168	1.00
August	157	1.10	August	169	0.90
September	158	1.10	September	170	1.10
October	159	1.10	October	171	1.60
November	160	1.20	November	172	1.45
December	161	1.20	December	173	1.45

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[1] The Conversion Value is Nuexco's judgment of the price at which spot and/or near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the last day of the month.

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ENRICHED URANIUM AND SWU

The short term secondary market remains active. A number of 3.5 year DOE requirements contract holders continue to seek secondary market supplies for FY 1983. These buyers are, in virtually all cases, utilities who have not yet terminated their requirements contracts, but who are seeking SWU priced low enough to allow them to terminate and purchase on the secondary market at a savings.

Nuexco is not presently aware of any sellers of DOE FY 1983 SWU willing to offer prices low enough to make such terminations economically attractive. The prevailing discount remains at approximately $25 per SWU from DOE's AFC price (at .2 tails). Those buyers may choose to purchase Eurodif SWU on the secondary market or retain their Requirements contracts. Nuexco is aware of two US utilities who decided last month to purchase Eurodif SWU for 1983 to replace Requirements contract deliveries.

Offers for DOE SWU in FY 1984 remain at about a $28-$30 discount from DOE's FY 1984 price, assuming a .2 tails assay. There remains a large surplus of DOE SWU available for FY 1984, and there have been few transactions recently. Some potential 1984 buyers, however, have indicated concern that the level of discounts offered may drop soon due to the introduction of the FR contract, so the level of activity in this market segment could increase in the near future.

The market for DOE SWU for FY 1985 and later has virtually disappeared while potential sellers await DOE's announcement of the terms and conditions of conversion to the FR contract. There are a number of secondary market sellers offering Eurodif SWU for long-term delivery at base escalated prices, but few transactions have actually taken place.

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CURRENT MARKET DATA

EXCHANGE VALUE $20.25/lb. U_3O_8
Determined as of December 31, 1982

Definition[1]

The Exchange Value is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the last day of the month.

Derivation

Nuexco bases the Exchange Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Exchange Value:

A. The price of uranium delivered or to be delivered under old contracts.
B. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.

[1] In December, 1981, Nuexco published a history of the Exchange Value which chronicled, month-by-month, changes in its definition, usage and derivation. Copies are available upon request.

TRANSACTION VALUE[2]
Determined as of December 31, 1982

$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
18.80	5.7	17	3

Definition

The Transaction Value is a weighted average price of recent transactions, and is based on prices paid for U_3O_8 in transactions closed within the previous three-month period and for which delivery was scheduled within one year of the transaction date. At least ten transactions totaling at least two million pounds U_3O_8 are included in each calculation, or the sample time is extended as necessary to include these minima. Foreign currencies are converted to US dollars as of the transaction date.

Comments

Nuexco does not consider the following in determining the Transaction Value:

A. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.
B. The price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of Exchange Value or any other independent variable. Also excluded from consideration are all data where the delivery price is defined in such a way that it cannot currently be determined.

[2] Transaction Values for 1976 through 1981 and their associated parameters (millions of pounds, number of transactions and number of months) are tabulated on pages 31 and 32 of Report 161.

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CONVERSION VALUE $1.45/lb. U as UF_6
Determined as of December 31, 1982

Definition

The Conversion Value is Nuexco's judgment of the price at which spot and/or near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the last day of the month.

Derivation

Nuexco bases the Conversion Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Conversion Value:

A. The price of conversion services delivered or to be delivered under old contracts.
B. The price of conversion services delivered in connection with contract renegotiations or other than arm's length transactions.

LOAN USE CHARGE RATE[1] 6%
Determined as of December 31, 1982

Definition

The Loan Use Charge Rate is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the last day of the month.

Derivation

Nuexco bases the Loan Use Charge Rate upon:

A. Data from recently completed or pending loan transactions.
B. Rates included in firm proposals to borrow or lend.
C. Rates that potential borrowers and lenders have expressed as a willingness to pay or accept, but for which Nuexco is not aware of firm proposals.

[1] Monthly data for 1968 through 1981 appear on pages 32-34 of Report 162.

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CURRENT MARKET DATA

TRANSACTION SUMMARY[1]

Uranium Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current E.V.	Seller	Buyer	Remarks
2058	1985-90	1001-3000	indeterminate	Canadian Producer	US Utility	Price related to market
2059	1983-90	1001-3000	indeterminate	Canadian Producer	European Utility	Price related to market
2060	1983-90	1001-3000	indeterminate	Canadian Producer	Canadian Utility	Price related to market
2061	1983-90	3001-6000	indeterminate	Canadian Producer	European Utility	Price related to market
2062	1983	601-1000	99	European Entity	European Entity	UF_6
2067	1983	less than 50	103	European Entity	Canadian Producer	
2068	1984-93	1001-3000	150	US Producer	US Utility	Base price plus escalation
2090	1983	1001-3000	97	European Entity	US Producer	UF_6
2102	1983	101-300	96	Unknown	US Utility	UF_6

Conversion Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U equivalent)	Approximate Price as Percent of Current C.V.	Seller	Buyer	Remarks
2097	1984	601-1000	100 or more	European Utility	European Utility	

Loan Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current L.U.C.R.	Lender	Borrower	Remarks
2106	unknown	101-300	108	US Utility	Canadian Producer	

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[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.

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URANIUM SUPPLY
(As of 12/31/82)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8) 0 to 1 Year	Beyond 1 Year	Remarks
Available for Sale:			
ACTIVE			
1575		500 per year	Long Term
1581	100		
1610	25		
1818		250 per year	Long Term
1921	2,100		UF_6
1925	500		UF_6
2017		2,300	
2020		200 per year	1983-92
2038	1,500		UF_6
2056	2,200		UF_6
2114	700		
2126	500		UF_6
2158	500		UF_6
2203	700		
TOTAL:	8,825		
INACTIVE			
1804	615		
1805		500 per year	Long Term
1877	100		
1928	1,000		UF_6
TOTAL:	1,715		

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[1] Measured from the date of this Report

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CURRENT MARKET DATA

URANIUM DEMAND
(As of 12/31/82)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8)		Remarks
	0 to 1 Year	Beyond 1 Year	
Inquiries to Purchase:			
ACTIVE			
1652		400 per year	Long Term
1871		250 per year	1983-86
1995	250		
1996		400	
2000		250	
2010		400 per year	1984-92
2014	160		
2030		1,350	1984-85
2042		400 per year	Long Term
2054	110		
2059	2,200		
2061	50		
2105	600		UF_6
2123	500	500 per year	1983-87
TOTAL:	3,870		
INACTIVE			
1459		200 per year	Long Term
1843	250		
1888		400 per year	Long Term
1963		50	
1966	100	200	
1985	100		
1999		50 per year	1985-90
2025		350	
2032		200	
2066		200	
2114		200 per year	1984-90
2115		200 per year	1984-85, UF_6
TOTAL:	450		

[1] Measured from the date of this Report.

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CONVERSION SUPPLY
(As of 12/31/82)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U as UF6)		Remarks
	0 to 1 Year	Beyond 1 Year	
ACTIVE			
1609	500	1,500 per year	Long Term
1840	130		
1902		400	
1936	1,000	200 per year	Long Term
2051	1,000		
TOTAL:	2,630		
INACTIVE			
1925	450		
2008	800	800	
TOTAL:	1,250		

CONVERSION DEMAND
(As of 12/31/82)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U as UF6)		Remarks
	0 to 1 Year	Beyond 1 Year	
ACTIVE			
1995	220		
2148		400 per year	1984-86
TOTAL:	220		
INACTIVE			
1594		450 per year	Long Term
1622		400	
TOTAL:			

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[1] Measured from the date of this Report.

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CURRENT MARKET DATA

LOAN SUPPLY AND DEMAND
(As of 12/31/82)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8) 0 to 1 Year	Beyond 1 Year	Remarks
Available for Loan:			
ACTIVE			
1938	2,000		
2006A	600		
2157	600		
TOTAL:	3,200		
INACTIVE			
1815	1,000		UF_6
1884	600		
1910	1,000		
1931	600		
2036	500		
2040	500		UF_6
2133	200		
TOTAL:	4,400		
Inquiries to Borrow:			
ACTIVE			
1998	200	200	
2006	600		
2070	200		UF_6 or U_3O_8
2125	500		UF_6 or U_3O_8
TOTAL:	1,500		
INACTIVE	None		

[1] Measured from the date of this Report

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AFRICA

South Africa's Koeberg nuclear power station was sabotaged in late December. Officials of the Electricity Supply Commission of South Africa (Escom) had expected to receive authorization to load fuel shortly, but now commissioning will be delayed for an as yet undetermined time. Although some control rod components will have to be replaced, the damage done on the political front could prove more serious. The success of the attack has called into question the adequacy of the plant's security measures, already more stringent than those at other nuclear power stations. Delays for that cause could be much longer than those due to the physical damage. In spite of this setback, the Koeberg station should begin operations before the end of 1983.

CANADA

Summary

Once again during 1982, the uranium news in Canada centered around the province of Saskatchewan, even though most Canadian U_3O_8 is still being produced in Ontario. A preliminary tabulation of uranium *shipments* indicates that Canada's uranium production for 1982 will total approximately 21 million pounds U_3O_8. That figure includes 8 million pounds from western Canada and 13 million pounds from eastern Canada. Production from both areas will probably increase during 1983. The onset of production from Key Lake and from Rio Algom's Stanleigh mine will more than offset the mid-1982 shutdowns of Eldorado's Beaver Lodge operations at Uranium City and Madawaska Mines' Bancroft, Ontario mine and mill. Aside from projects already under development, exploration and development activity in Canada is generally declining, pending higher uranium prices.

Major Commercial Events

Ontario Hydro deferred delivery of a portion of the Elliot Lake material covered by their long-term supply agreements with Denison and Rio Algom and purchased 13.5 million pounds of Key Lake material from Eldorado Nuclear and Uranerz Exploration and Mining Limited. This move will reduce Ontario Hydro's average annual U_3O_8 costs by substituting relatively low-cost uranium from Saskatchewan for some of their higher-cost uranium produced in Ontario.

* * *

Eldorado Nuclear announced the purchase of all the outstanding shares of Gulf Minerals Canada Limited in return for uranium concentrates from Eldorado's inventory (essentially all of the Canadian stockpile). The sale was concluded in October. As a result, Gulf Oil is no longer a uranium producer in Canada and Eldorado has acquired the Rabbit Lake mill and Gulf's share of the associated orebodies as well as the Collins Bay deposit. In a separate transaction, Eldorado acquired sole ownership in the Rabbit Lake mill by purchasing Uranerz Canada Limited's minority interest. Rabbit Lake is presently producing about three million pounds per year and output should increase to five million pounds per year by 1985 with the changeover to Collins Bay ore. Eldorado received approval for its environmental impact assessment for the Collins Bay "B" zone at the end of 1982.

* * *

Development of the Key Lake project continued throughout 1982 and initial production is expected by mid-1983. Sales efforts of the Key Lake partners also met with continuing success in 1982. SMDC announced in November that the Canadian government had approved sales contracts totaling 14.5 million pounds U_3O_8. The press release stated that "SMDC's share of the Key Lake project is largely committed through 1986 and is approximately 75 percent committed for the period from the startup until 1990." SMDC owns 50 percent of Key Lake; Uranerz owns 33-1/3 percent and Eldorado Nuclear owns 16-2/3 percent. All partners have achieved considerable sales successes and remain aggressive and competitive in the marketplace.

FAR EAST

Japan has produced its first domestic UF_6 from the PNC (Power Reactor and Nuclear Fuel Development Corporation) pilot plant at Ningyo Pass. The plant employs a unique technology, developed by PNC, in which uranium ore bypasses the concentrates stage. PNC plans to increase capacity at the combination refinement-conversion facility to 200 metric tons per year.

* * *

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Construction of Chubu Electric Power Company's Hamaoka Unit 3 (1,100 MWe BWR) has begun. Scheduled to begin commercial operations in 1986, it would give Chubu almost 2,500 MWe of nuclear generating capacity, approximately 11 percent of the company's total electrical output.

UNITED STATES

Summary

The US uranium industry continued during 1982 the liquidation trend established in 1981, as several holders of substantial amounts of inventory acted aggressively during the year to dispose of them. Further contraction of the industry was seen in the producer sector. Although some producers see the recent upturn in price, and a balanced supply-demand ratio, as hopeful signs for the future, it would be premature to suggest that this foreshadows an upward price trend or that a healthy US uranium market is probable in the near term.

Production Cutbacks

US uranium production declined in 1982 to 25.4 million pounds U_3O_8. This figure represents a 30 percent decline since 1981. Nuexco's US production forecast anticipates an additional 40 percent decline in 1983, to 14.6 million pounds U_3O_8. A reaction to the sustained drop in price since 1979 prompted continued cutbacks and shutdowns by producers during the year, and that trend is continuing. Those which took place in 1982 are listed in chronological order, among other significant 1982 activities of US producers, in Table 17 on page 32 of this Report's *Raw Materials* section.

Price Upturn

Nuexco's Exchange Value came nearly full circle in 1982, starting at $23.50 in January, declining steadily to $17.00 in August and September, and finishing at $20.25 on December 31. Many US utilities have perceived this price pattern as an end to declining prices. There is renewed interest on the part of US buyers to purchase under long-term contracts at present price levels before a sustained increase in price develops. This recent upsurge in demand on the part of US (and non-US) buyers has caused a dramatic recovery in the active supply-demand ratio from an imbalanced 16.2:1 as of June 30 to an almost ideal 1:1 as of November 30.

Among the many reasons for the sudden reversal of the US supply-demand situation, the most obvious is the subsidence of selling pressure which several inventory holders had been putting on the market. Earlier in the year, more than half of the total available supply might have been offered by US inventory holders. As of the end of December, the single inventory seller is offering for sale just 500 thousand pounds U_3O_8. That quantity amounts to less than one percent of US commercial inventories of uranium. According to Nuexco's latest estimate, US commercial inventories currently amount to approximately 147 million pounds U_3O_8. This figure includes all commercial inventories not in the fabrication pipeline, including concentrates, natural UF_6 and enriched U_3O_8.

Producers' Purchases

Due to the fact that spot prices were, for the greater part of the year, lower than the production costs of many US producers, several producers found it prudent to purchase uranium to meet their existing contractual obligations and to cease further market activity. During the year, nine US producers purchased a total of approximately 9 million pounds U_3O_8, some of which was in the form of UF_6.

Effect of Attempt to Limit Imports

The decision by some of the remaining US producers to cease marketing activity may have been influenced by recent attempts on the part of Senator Domenici to reestablish an import quota. Although the House of Representatives emphatically rejected the proposed embargo measure by a vote of 241-148, the possibility of an import restriction encouraged the US producers to slow their marketing activities pending the outcome of the legislation. In other cases, US producers felt pressured in the long-term market by foreign, especially Canadian, competition for US market share. Evidence of the Canadian marketing activity in the US is reflected by the fact that Canadian producers won several important long-term uranium sales contracts with US buyers.

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Table 6

UNITED STATES NUCLEAR POWER PLANTS: LICENSING PROGRESS IN 1982

COMMERCIAL OPERATION

Plant	Utility	Net MWe	Type	COD
Sequoyah 2	TVA	1148	PWR	6/82

FULL POWER OPERATING LICENSES ISSUED

Plant	Utility	Net MWe	Type
LaSalle 1	Commonwealth Edison	1078	BWR
Susquehanna 1	Pennsylvania P&L	1050	BWR
San Onofre 2	So. California Edison	1000	PWR
Summer	So. Carolina	900	PWR

LOW POWER TESTING LICENSES ISSUED

Plant	Utility	Net MWe	Type
Grand Gulf 1	Middle South	1250	BWR
San Onofre 3	So. California Edison	1000	PWR

Nuclear Power Progress in 1982

Construction delays and financial difficulties continued to plague US utilities in 1982. Only one reactor, TVA's Sequoyah Unit 2, went into commercial operation in 1982. Additionally, only four full power licenses and two low power licenses were issued, representing a total capacity of 6300 megawatts. The licensing progress of US nuclear power reactors during 1982 is summarized in Table 6. During that same period, nine reactors experienced delays, five were indefinitely deferred and nineteen were cancelled. The total generating capacity cancelled is 23,000 megawatts. Table 7 lists the delays, deferrals and cancellations experienced by US reactors in 1982.

Table 8 lists the US reactors under construction in descending order of completion percentage. Nuexco forecasts call for cancellation of at least 15 reactors now under construction or on order. This represents approximately 17,800 megawatts of generating capacity and approximately 6 million pounds of U_3O_8 average annual consumption. The USNRC estimates 21 reactors will receive operating licenses during 1983, representing a total of 23,000 megawatts. The estimates include five reactors which were originally scheduled to receive operating licenses in late 1982.

Outlook for 1983

The US market is experiencing a time of uncertainty and instability. Recent signals that spot prices are increasing have caused a change in psychology which may, in itself, prove to be sufficient to maintain an upward pressure on price. However, the rise in the spot price should be watched carefully due to the large amount of inventory still overhanging the market now and in the near term. Price fluctuations will correlate with the rate at which these inventories are introduced into the market. Full recovery is expected to follow a series of ups and downs, spanning a period of several years.

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Table 7

UNITED STATES NUCLEAR POWER PLANTS: DELAYS, DEFERRALS AND CANCELLATIONS IN 1982

Plant	Utility	Net NWe	Type	Delay From	Delay To	No. of Months
PROJECTS DELAYED AT LEAST ONE YEAR						
Bellefonte 2	TVA	1213	PWR	2/88	11/89	21
Catawba 1	Duke Power	1145	PWR	3/84	6/85	15
Catawba 2	Duke Power	1145	PWR	9/85	6/87	21
Clinton 1	Illinois Power	950	BWR	8/83	8/84	12
Diablo Canyon 2	Pacific G&E	1106	PWR	–/82	–/83	12
Limerick 2	Philadelphia Elec.	1055	BWR	–/87	–/90	36
River Bend 1	Gulf States	940	BWR	4/84	12/85	20
WNP 3	WPPSS	1240	PWR	12/86	open	24-60
Zimmer 1	Cincinnati G&E	810	BWR	–/83	–/84	12
PROJECTS INDEFINITELY DEFERRED						
Hartsville A1	TVA	1233	BWR	4/91	indef	—
Hartsville A2	TVA	1233	BWR	4/92	indef	—
WNP 1	WPPSS	1250	PWR	6/86	indef	—
Yellow Creek 1	TVA	1285	PWR	10/90	indef	—
Yellow Creek 2	TVA	1285	PWR	—	indef	—

PROJECTS CANCELLED

Plant	Utility	Net MWe	Type	% Complete at Cancel.	Cost
Allens Creek	Houston L&P	1200	BWR	0	$326 million
Black Fox 1	PS Oklahoma	1150	BWR	0	$300 million
Black Fox 2	PS Oklahoma	1150	BWR	0	for 2 units
Cherokee 2	Duke Power	1280	PWR	0	$68 million
Cherokee 3	Duke Power	1280	PWR	0	for 2 units
Hartsville B1	TVA	1233	BWR	17	$1.8 billion
Hartsville B2	TVA	1233	BWR	7	for 4 TVA units
Hope Creek 2	PS Elec. & Gas	1067	BWR	18	$172 million
Pebble Springs 1	Portland GE	1260	PWR	0	$242 million
Pebble Springs 2	Portland GE	1260	PWR	0	for 2 units
Perkins 1	Duke Power	1280	PWR	0	$6.5 million
Perkins 2	Duke Power	1280	PWR	0	for 3 units
Perkins 3	Duke Power	1280	PWR	0	
Phipps Bend 1	TVA	1233	BWR	27	See reference
Phipps Bend 2	TVA	1233	BWR	5	above for TVA
North Anna 3	Vepco	907	PWR	9	$566 million
Vandalia	Iowa P&L	1270	PWR	0	$8 million
WNP 4	WPPSS	1250	PWR	27	$3 billion
WNP 5	WPPSS	1240	PWR	14	for 2 units

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Table 8

STATUS[1] OF US NUCLEAR REACTORS UNDER CONSTRUCTION

Reactor	Utility	Percent Complete	Planned COD[2]
Diablo Canyon 1	Pacific G&E	100	10/83
LaSalle 1	Commonwealth Edison	100	2/83
Summer 1	So. Carolina E&G	100	10/83
Grand Gulf 1	Middle South Utilities	99	2/83
San Onofre 2	So. California Edison/San Diego G&E	98	3/83
Zimmer 1	Cincinnati G&E	97	-/84
Palo Verde 1	Arizona PS	97	5/83
Waterford 3	Louisiana P&L	94	7/83
Susquehanna 1	Pennsylvania P&L	93	5/83
McGuire 2	Duke Power	92	10/83
Diablo Canyon 2	So. California Edison/San Diego G&E	91	4/84
WNP 2	WPPSS	90	2/84
Shoreham	Long Island Lighting	90	3/83
Fermi 2	Detroit Edison	90	11/83
Catawba 1	Duke Power	89	6/85
San Onofre 3	So. California Edison/San Diego	89	12/83
Comanche Peak 1	Texas Utilities	88	-/84
St. Lucie 2	Florida P&L	88	5/83
LaSalle 2	Commonwealth Edison	85	10/83
Palo Verde 2	Arizona PS	85	5/84
Clinton 1	Illinois Power	83	8/84
Perry 1	Cleveland Electric	82	5/84
Watts Bar 1	TVA	81	11/84
Callaway 1	Union Electric	80	4/84
Bryon 1	Commonwealth Edison	80	2/84
Midland 1	Consumers Power	80	7/84
Midland 2	Consumers Power	80	12/83
Bellefonte 1	TVA	79	11/86
Wolf Creek	Kansas G&E	77	5/84
Limerick 1	Philadephia Electric	74	4/85
Seabrook 1	PS New Hampshire	70	2/84
Bellefonte 2	TVA	65	11/89
Susquehanna 2	Pennsylvania P&L	65	-/84
Bryon 2	Commonwealth Edison	64	2/85
Shearon Harris 1	Carolina P&L	64	9/85
WNP 1	WPPSS	63	indef
Braidwood 1	Commonwealth Edison	62	10/85
South Texas 1	Houston L&P	60	-/86
WNP 3	WPPSS	54	12/86
Beaver Valley 2	Duquesne L&P	53	5/86
Watts Bar 2	TVA	52	12/85

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Table 8

STATUS[1] OF US NUCLEAR REACTORS UNDER CONSTRUCTION

Reactor	Utility	Percent Complete	Planned COD[2]
Hope Creek 1	PS Electric & Gas	50	12/86
River Bend 1	Gulf States Utilities	50	12/85
Comanche Peak 2	Texas Utilities	49	–/85
Braidwood 2	Commonwealth Edison	48	10/86
Millstone 3	Northeast Utilities	45	5/86
Nine Mile Point 2	Niagara Mohawk Power	44	10/86
Hartsville A1	TVA	44	indef
Perry 2	Cleveland Electric	42	5/88
Catawba 2	Duke Power	42	6/87
Palo Verde 3	Arizona PS	39	5/86
Yellow Creek 1	TVA	35	indef
Marble Hill 1	PS Indiana	35	–/86
Hartsville A2	TVA	34	indef
Vogtle 1	Georgia Power	32	3/87
Limerick 2	Philadelphia Electric	30	–/90
Phipps Bend 1	TVA	27	indef
South Texas	Houston L&P	23	–/86
Grand Gulf 2	Middle South Utilities	22	indef
Seabrook 2	PS New Hampshire	20	5/86
Cherokee 1	Duke Power	18	indef
Marble Hill 2	PS Indiana	17	–/87
Vogtle 2	Georgia Power	9	9/88
Phipps Bend 2	TVA	5	indef
Shearon Harris 2	TVA	4	3/89
Yellow Creek 2	TVA	3	indef
Carroll County 1	Commonwealth Edison	0	–/99
Carroll County 2	Commonwealth Edison	0	–/2000
River Bend 2	Gulf States Utilities	0	indef
Skagit 1	Puget Sound P&L	0	–/91
Skagit 2	Puget Sound P&L	0	–/93

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[1] Information from Nuclear News World List as of August 1982 and assorted printed articles.
[2] Commercial operating date.

ANALYSIS & COMMENTARY

FORECAST OF APPARENT FUTURE CONSUMPTION

Introduction

This Report presents Nuexco's forecasts of Apparent Future Consumption of U_3O_8 and installed nuclear electric generating capacity, as of September 30, 1982. The forecasts are quantified in Tables 9 and 10, respectively, and are graphically depicted in Figures 1 and 2.

As used by Nuexco, the term "consumption" refers to a theoretical calculation of the U_3O_8 which will be effectively consumed annually in the operation of a given nuclear power plant, with time allowed for this fuel to proceed through the fuel cycle from the time of entering the U_3O_8-UF_6 conversion plant until the time that fabricated fuel is ready for reactor loading. In other words, it is Nuexco's estimate of the quantity of uranium that nuclear power plant operators would calculate as U_3O_8 required for their nuclear power plants with adequate allowance for fuel cycle processing time, *if they used the same assumptions as Nuexco's analysis.*

Apparent future consumption is not the same, however, as the unfilled requirements for uranium which nuclear power plant operators can be expected to purchase in the future. Unfilled requirements depend on existing inventories, past commitments for future deliveries, and individual utility procurement practices.

Summary of Results

Europe has surpassed the US as the foremost consumer of uranium. Nuexco's forecast indicates apparent future consumption for Europe in 1982 will exceed that of the US by fully one-third. The forecast calls for that margin to grow slightly over the next ten years, to nearly 40 percent by 1991. That forecast differential is almost double the corresponding estimate from Nuexco's previous forecast, published in Report 164.

As of 1982, the US share of Free World annual apparent consumption is almost one-third. That share is forecast to remain above 30 percent throughout the ten-year forecast period. Europe's share is forecast to remain steady at approximately 44 percent. Therefore, the two regions taken together account for three-fourths of the Free World's apparent future consumption throughout the forecast period.

The Far East accounts for approximately one-sixth of the total throughout the period. The remainder of the Free World accounts for only 6-7 percent of the total apparent future consumption.

Nuexco's forecast estimates 1982 apparent future consumption for the Free World at 63.4 million pounds U_3O_8 equivalent. That figure is forecast to increase by almost 70 percent by 1988, to approximately 107 million pounds U_3O_8, and to reach a level of 110 million pounds by 1991.

Methodology

The methodology used in developing Nuexco's forecasts of Apparent Future Consumption and installed nuclear electric generating capacity is summarized below:

1. The growth of uranium consumption is primarily dependent upon the growth of nuclear power generation. The growth of commercial nuclear power is principally determined by the following factors:

    a. Economic growth of industrial nations;
    b. Energy consumption of industrial nations;
    c. Electrical load growth of nations;
    d. National energy alternatives;
    e. Economics of nuclear power;
    f. The owner utility's financial condition and the estimated likelihood of relief from ratemaking bodies;
    g. Construction progress to date for individual nuclear plants and the owner utility's construction experience for conventional as well as nuclear units;
    h. International policies and proliferation controls;
    i. National political and environmental influences;
    j. Licensing and regulation;
    k. Societal constraints, such as the active opposition of anti-nuclear pressure groups.

2. These factors are first analyzed on a country-by-country basis, and then within each country, on a plant-by-plant basis. The initial results are then used to evaluate announced national plans or announced needs of individual utilities. At later stages, the results of the numerical analysis are revised according to subjective and judgmental analysis. Then, the Apparent Future Consumption is calculated for each reactor based on the following assumptions.

3. The principal variable that will affect apparent future consumption is the uranium tails assay from the enrichment plants. Under the DOE Adjustable Fixed Commitment (AFC) enrichment contract and the new Facility Requirements (FR) enrichment contract, electric utilities and other entities have the option, within limits, to specify the transaction tails assay for the uranium enrichment of their material. This variable tails assay option permits customers to minimize the cost of enriched uranium product by selection of an optimum tails assay. For example, if an electric utility purchased

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Table 9

APPARENT FUTURE CONSUMPTION[1]

(millions of pounds U_3O_8)

BUYER GROUP	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**
United States										
Reactors now operational	19.1	19.1	19.1	19.1	18.8	18.5	18.2	17.9	17.7	17.4
Now under construction	1.8	5.5	11.6	12.5	14.7	16.8	21.2	16.8	18.0	17.3
Now on order/planned/future	0	0	0	0	0	0	0	0	0	0
US Subtotal	20.9	24.6	30.7	31.6	33.5	35.3	39.4	34.7	35.7	34.7
Europe										
Reactors now operational	21.0	21.3	21.3	21.0	21.0	20.8	20.4	20.2	20.0	19.3
Now under construction	6.9	13.0	15.2	22.0	20.9	20.6	21.9	22.0	21.0	21.3
Now on order/planned/future	0	0	0	0	0	1.3	2.6	4.2	5.9	7.5
Europe Subtotal	27.9	34.3	36.5	43.0	41.9	42.7	44.9	46.4	46.9	48.1
Far East[2]										
Reactors now operational	7.6	7.6	7.6	7.4	7.2	7.0	6.9	6.8	6.6	6.4
Now under construction	3.2	3.2	3.5	4.7	6.0	5.2	4.9	6.1	6.0	5.2
Now on order/planned/future	0	0	0	0	1.2	2.8	3.9	4.6	4.0	8.0
Far East Subtotal	10.8	10.8	11.1	12.1	14.4	15.0	15.7	17.5	16.6	19.6
Other Free World[3]										
Reactors now operational	2.8	2.8	2.8	2.4	2.4	2.4	2.4	2.4	1.9	1.9
Now under construction	1.0	1.4	1.8	1.6	2.2	3.8	3.6	3.1	3.2	3.2
Now on order/planned/future	0	0	0	0	0	1.2	0.9	1.0	2.0	2.4
Other Subtotal	3.8	4.2	4.6	4.0	4.6	7.4	6.9	6.5	7.1	7.5
FREE WORLD[3] TOTAL	63.4	73.9	82.9	90.7	94.4	100.4	106.9	105.1	106.3	109.9
Worldwide Breakdown by Status										
Reactors now operational	50.5	50.8	50.8	49.9	49.4	48.7	47.9	47.3	46.2	45.0
Now under construction	12.9	23.1	32.1	40.8	43.8	46.4	51.6	48.0	48.2	47.0
Now on order/planned/future	0	0	0	0	1.2	5.3	7.4	9.8	11.9	17.9

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[1] Computed quantities of U_3O_8 which would be used under the given conditions to fabricate fuel for loading and reloading reactors operational, under construction, on order, or forecasted as of September 30, 1982. Compiled and computed on a reactor by reactor basis; quantities for each reactor are based on specific core characteristics, 0.25% tails assay, no recycling, 24-month lead time for procuring first cores and 18-month lead time for procuring each reload. Estimates reflect annual consumption displaced in time to the start of the conversion-enrichment-fabrication cycle for timely loading into the reactor; they do not reflect refueling cycles.

[2] Japan, Korea, Taiwan, Philippines

[3] Excludes Bulgaria, Czechoslovakia, German Democratic Republic, Finland (two Russian reactors), Hungary, People's Republic of China, Poland, Romania, USSR

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Table 10

NUCLEAR ELECTRIC GENERATING CAPACITY[1] [2]
(thousands of MWe — net)

BUYER GROUP	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
United States										
Reactors now operational	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0
Now under construction	0	6.4	13.8	20.4	29.1	34.4	38.7	44.0	51.7	53.8
Now on order/planned/future	0	0	0	0	0	0	0	0	0	0
US Subtotal	58.0	64.4	71.8	78.4	87.1	92.4	96.7	102.0	109.7	111.8
Europe										
Reactors now operational	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.4
Now under construction	5.1	13.7	18.9	27.9	37.5	48.3	55.8	59.6	63.5	63.5
Now on order/planned/future	0	0	0	0	0	0	0	1.3	2.5	9.4
Europe Subtotal	59.6	68.2	73.4	82.4	92.0	102.8	110.3	115.4	120.5	127.3
Far East[3]										
Reactors now operational	20.7	20.7	20.7	20.7	20.7	20.7	20.7	20.7	20.7	20.7
Now under construction	0	0	3.0	5.8	9.6	11.8	14.5	16.3	16.3	17.2
Now on order/planned/future	0	0	0	0	0	0	1.1	2.7	5.7	8.7
Far East Subtotal	20.7	20.7	23.7	26.5	30.3	32.5	36.3	39.7	42.7	46.6
Other Free World[4]										
Reactors now operational	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Now under construction	0	0.9	2.3	4.3	6.4	7.7	8.7	10.7	12.5	13.4
Now on order/planned/future	0	0	0	0	0	0	0	1.2	1.8	2.7
Other Subtotal	8.0	8.9	10.3	12.3	14.4	15.7	16.7	19.9	22.3	24.1
FREE WORLD[4] TOTAL	146.3	162.2	179.2	199.6	223.8	243.4	260.0	277.0	295.2	309.8
Worldwide Breakdown by Status										
Reactors now operational	141.2	141.2	141.2	141.2	141.2	141.2	141.2	141.2	141.2	141.1
Now under construction	5.1	21.0	38.0	58.4	82.6	102.2	117.7	130.6	144.0	147.9
Now on order/planned/future	0	0	0	0	0	0	1.1	5.2	10.0	20.8

[1] Installed as of year end

[2] Uses Nuexco's estimates of commercial operating dates

[3] Japan, Korea, Taiwan, Philippines

[4] Excludes Bulgaria, Czechoslovakia, German Democratic Republic, Finland (two Russian reactors), Hungary, People's Republic of China, Poland, Romania, USSR

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ANALYSIS & COMMENTARY

Figure 1

FREE WORLD APPARENT FUTURE CONSUMPTION
(Millions of Pounds U_3O_8 Equivalent)

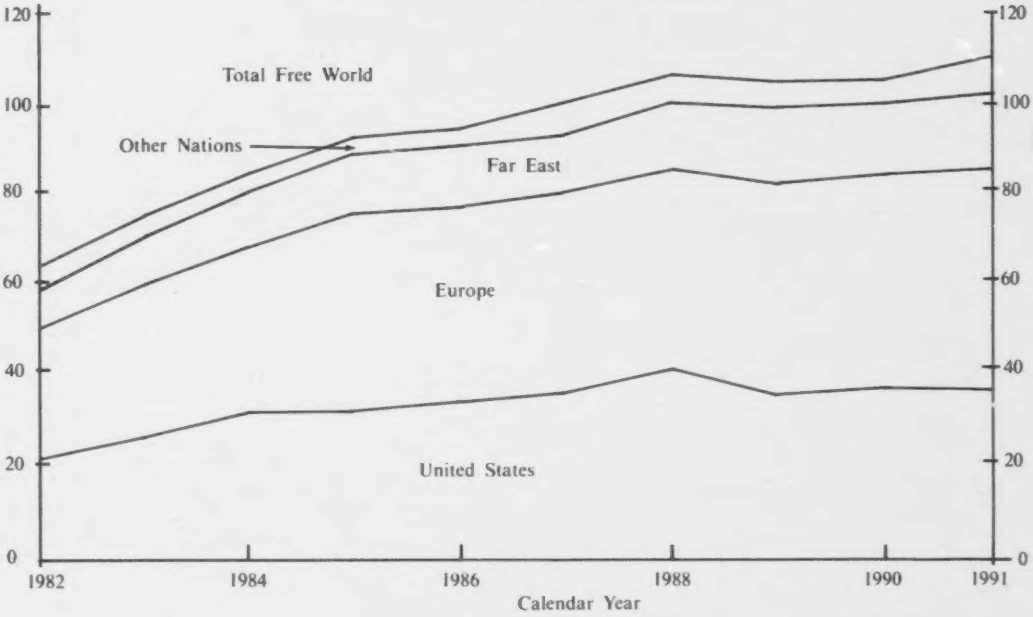
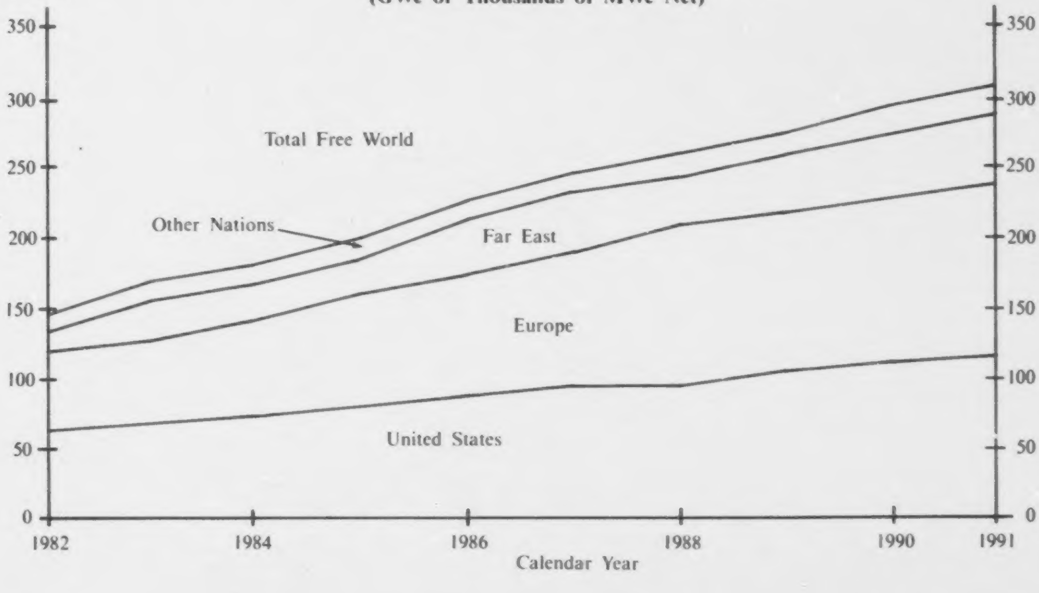


Figure 2

FREE WORLD ELECTRIC GENERATING CAPACITY
(GWe or Thousands of MWe Net)



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uranium in November 1982 at a cost of $17.50 per pound U_3O_8 for enrichment in May 1983 with a Separative Work Unit (SWU) price of $138.65 per kilogram of uranium, the optimum tails assay would be about 0.34 percent. This compares with a 0.20 percent constant tails assay for DOE Requirements contracts.

The rise in optimum tails assay in the enrichment process reflects the recent declining price of U_3O_8 compared with concurrent escalation of the enrichment cost. A tails assay of 0.31 percent requires about 22 percent more U_3O_8 feed than the 0.20 percent tails assay; however, the smaller number of SWUs required for enrichment results in a lower cost of enriched product. The Nuexco consumption forecasts in Table 9 reflect the use of a 0.25 percent tails assay which represents the approximate average expected in the future.

4. Capacity factor for each reactor is estimated according to historical performance of each reactor type. The historical tabulation of capacity factor for four reactor types, for the years 1968 through 1981, is as shown in Table 11.

After assessing those records, Nuexco chose the capacity factor estimates shown in Table 12.

Nuexco has, in previous forecasts, characterized nuclear plant performance by regression analysis of capacity factors as a function of operating time, refueling periods and other parameters. Studies by other organizations have also described nuclear plant performance by functions representing plant startup periods, normal operating periods and end-of-life operating periods. It is Nuexco's opinion that none of these studies have developed sufficiently reliable predictive measures of nuclear plant operating performance. Large nuclear plants in initial operating periods have performed as well as smaller plants in mid-operating life. In fact, the variable that best correlates with plant performance is the capability of operating and maintenance staff. Since staff performance is difficult to quantify, Nuexco has elected in this study to use a constant nominal capacity factor for each reactor type.

Use of the Nuexco estimates of plant capacity factors shown in Table 12 increases uranium consumption requirements by about 10 percent as compared to earlier Nuexco forecasts. Those studies estimated capacity factor based on a regression analysis as a function of plant life. That method penalized the large nuclear plants early in their life cycle and rewarded the small plants late in their life cycle. Since the large nuclear plants consume the majority of the uranium, this effect lowered previous uranium consumption forecasts.

Table 12

NUCLEAR PLANT CAPACITY FACTOR ESTIMATES

Reactor Type	Percent
Boiling water reactor (BWR)	65
Pressurized water reactor (PWR)	65
Heavy water reactor (HWR)	75
Gas-cooled reactor (GCR)	55
Advanced gas-cooled reactor (AGCR)	55

Table 11

HISTORICAL TABULATION[1] OF NUCLEAR PLANT CAPACITY FACTOR (in percent) BY REACTOR TYPE

Reactor Type	Average Annual Capacity Factor	Weighted Average Annual Capacity Factor	Number and Output of Reactors
BWR	60.1	60.0	56 (41,544 MWe)
PWR	60.6	59.4	97 (78,848 MWe)
HWR	74.5	83.2	13 (6,526 MWe)
GCR	48.0	48.2	26 (8,515 MWe)

[1] Nuclear Engineering International, October 1982

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5. Potential improvements in fuel utilization are forecast as shown in Table 13.

Nuexco forecasts of apparent future consumption reflect the uranium utilization savings of Table 13 in all Free World light water reactors which entered service after December 1968. The net result of these forecast nuclear physics improvements is a reduction of annual uranium consumption of about 16 percent by 1990 in those nations which have predominantly light water reactor power plants, such as France, Germany and Japan, and the US.

A similar approach was followed for heavy water reactor plants, where modest improvements in uranium utilization were assumed by 1985, but larger gains were instituted by 1990 through the use of slightly enriched uranium (1.20 percent U_{235}) in reload fuel. For conservatism, no improvements were assumed for gas-cooled reactor plants.

6. The forecasts assume that:

a. U_3O_8 deliveries for first cores predate commercial operation by two years;

b. First reload follows installation of first core by 12 months;

c. U_3O_8 delivery for first reload predates refueling outage by 12 months.

7. Using the assumptions listed above, the consumption for a given reactor can be computed as a function of thermal power, capacity factor, fuel exposure, enrichment level, process losses, tails assay and commercial operating date.

8. Actual commercial operating dates can vary widely from published dates. Nuexco uses the best information available, much of it from unpublished sources, to prepare its own forecasts of operating dates. Such information often changes more frequently than does public information; Nuexco attempts to anticipate such changes as much as possible.

9. The fuel cycles considered in this analysis are once-through systems which involve the storage or disposal of spent nuclear fuel. It is recognized that several countries have reprocessing facilities and are currently reprocessing nuclear fuel. However, the extracted uranium and plutonium from these facilities that will be recycled is not significant over the forecast period and has been excluded from the results of this study.

Limitations

Limitations of the forecasts detailed in Tables 9 and 10 are as follows:

1. Forecasts of Apparent Future Consumption are not forecasts of actual uranium demand. Rather, these forecasts comprise a portion of uranium demand more commonly referred to as reactor demand or reactor requirements. As indicators of the amount of uranium which will be needed to fuel the reactors under consideration, these forecasts should be regarded as relatively hard demand in the sense that this portion of demand is quite insensitive to uranium prices. Market demand for the assumed pattern of capacity additions can be higher or lower, depending on users' inventory policies.

2. Factors which can cause demand to exceed Apparent Future Consumption are:

a. Utility buyers plan their procurement strategies to achieve a very high probability of having access to at least enough uranium to meet commitments as they arise;

Table 13

NUCLEAR FUEL IMPROVEMENTS IN LIGHT WATER REACTORS

Year	U_3O_8 Requirements for Equilibrium Reload Fuel (Millions of Pounds U_3O_8 per Gigawatt-Year		U_3O_8 Utilization Savings[1] (Percent)	
	BWR	PWR	Reference BWR	Reference PWR
1980	0.395	0.369		
1985	0.359	0.349	9.1	5.4
1990	0.308	0.325	22.0	11.9
1995	0.308	0.325	22.0	11.9

[1] At 0.25% tails assay and 65% plant capacity factor

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b. Accelerated reactor construction schedules can advance the dates of uranium need;

c. Buyers may elect to purchase uranium in excess of need, simply to enhance security of supply;

d. Utility obligations to suppliers of fuel cycle services such as conversion, enrichment or fabrication, may require earlier purchase of uranium than a reactor's operating schedule would otherwise indicate.

3. Demand can fall short of Apparent Future Consumption if uranium inventories are reduced in order to fill needs which would otherwise appear as demand.

4. Reactors fueled by the USSR are excluded from Nuexco's forecasts. Although Soviet bloc reactors account for substantial demand, Soviet participation in uranium trading in the Western market has been negligible and appears likely to remain so.

5. Nuexco forecasts include provisions for some US reactor plant orders which have not yet been placed, but they have no effect on consumption or installed capacity until after 1991. Nuexco forecasts include provisions for the startup of some reactors not yet ordered in France and Japan. Those units are included based on the shorter construction cycles prevalent in those countries. Also, their planning and approval processes are such that substantial site and engineering planning is done before actual orders are placed.

SUPPLY AND DEMAND ANALYSIS

The supply-demand analysis resulting from Nuexco's most recent forecasts of production and consumption of uranium is presented in Table 14 (Free World) and Table 15 (US). Conclusions which may be drawn from the analysis include the following:

1. Table 14 shows forecast world production of U_3O_8 exceeding forecast consumption in each year through 1986 but, after 1982, not by large margins. Therefore, for the first half of the ten-year forecast period, the relatively small cumulative imbalance between supply and demand can be relieved by annual additions to inventory.

2. During the second half of the forecast period, Table 14 indicates the opposite situation. In each year of the period 1987-1991, forecast consumption exceeds forecast production by margins much smaller than the supply excess of the period 1982-1986. Thus, the relatively insignificant supply shortfalls can be filled by withdrawals from inventory.

3. The comparison in Table 14 of Nuexco's forecasts of Free World production and consumption depicts a worldwide uranium industry on the verge of achieving intermediate-term to long-term stability. Although spot or near-term imbalances may still occur, Nuexco's latest forecasts indicate that they will be temporary.

This outlook is quite different from that of Nuexco's forecast of just a year ago. That forecast, published in Table 6 of Report 159, anticipated a steadily rising world inventory exceeding 600 million pounds U_3O_8 by 1989. The persistence of higher production estimates in the face of rising costs, high inventories and low prices was due to the increased time delay associated with captive producers' responses to the market. During the past year, several captive producers have given indications that they are reducing output in response to the market, so Nuexco's current forecast calls for a cumulative reduction of almost ten percent in uranium production over the period 1982-1990. In addition, certain positive developments, such as the "Konvoy" concept in West Germany, have led to increases in the forecast of consumption. Their combined effects have led to a current forecast of 1991 beginning inventory (457 million pounds) that is 25 percent below that published in Report 159 (616 million pounds).

4. The estimated inventory of approximately 400 million pounds U_3O_8 equivalent as of January 1, 1982 represents approximately five years of forward consumption. The forecast Free World inventory of 438 million pounds as of January 1, 1983 also represents five years of forward consumption. *Relative inventory* is forecast to decrease steadily throughout the remainder of the ten-year period to a level of four years' consumption.

5. New reactor orders or political or national policy considerations may generate enough additional demand to absorb production from production centers planned, but not yet firmly committed. However, it is more likely that a major driving force behind any such additional production entering the market will be the displacement of higher-cost production centers.

6. The analysis in Table 15 (US) is of the same basic form as that of Table 14 (Free World), but the US analysis includes an adjustment for US import-export commitments (Table 16). It also takes account of Nuexco's opinion that US utilities will collectively maintain at least 18 months' forward consumption in inventory.

7. Table 15 shows US uranium consumption exceeding US uranium production in each year between 1983 and 1991. Forecast uranium production declines steadily through 1990, to little more than half the estimated 1982 level of approximately 26 million pounds U_3O_8.

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8. Forecast US consumption increases by almost 50 percent between 1983 and 1991, so that the 1991 level of 34.7 million pounds (apparent future consumption) is more than double the forecast US production of 16.9 million pounds U_3O_8.

9. Annual net imports offset some of the US production shortfalls, but Table 15 shows an annual supply deficit in each year beginning in 1983. Over the ten-year period, the forecast indicates a cumulative US supply deficit of 150 million pounds U_3O_8.

10. Assuming US utilities will reduce inventories to an average level of 1.5 years' relative inventory, the result is unfilled demand of 62.4 million pounds U_3O_8 between 1988 and 1991. Actually, the current maldistribution of US utility inventories will almost certainly persist, at least to some extent, so that unfilled demand will actually be larger than estimated and will take effect in earlier years. The inventory situation depicted in Table 15 would only apply if US utility inventories were perfectly liquid. In that situation, without additional US imports or more US production, US inventory would decline to 1.5 years' forward consumption by 1988.

Table 14

URANIUM SUPPLY-DEMAND BALANCE: WOCA[1]
(millions of pounds U_3O_8 equivalent)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
PRODUCTION[2]										
Operating production centers	102.5	87.2	85.1	85.8	86.6	85.5	84.6	84.8	84.4	88.6
Facilities under construction	0.7	3.2	8.9	9.6	13.3	13.3	14.2	13.8	13.8	13.1
Planned facilities	0	0	0	0	0.5	1.0	1.0	1.0	2.0	4.0
Total	103.2	90.4	94.0	95.4	100.4	99.8	99.8	99.6	100.2	105.7
less										
CONSUMPTION[3]	63.4	73.9	82.9	90.7	94.4	100.4	106.9	105.1	106.3	109.9
equals										
NET INVENTORY INCREASE/(DECREASE)	39.8	16.5	11.1	4.7	6.0	(0.6)	(7.1)	(5.5)	(6.1)	(4.2)
plus										
BEGINNING INVENTORY	397.9[4]	437.7	454.2	465.3	470.0	476.0	475.4	468.3	462.8	456.7
equals										
ENDING INVENTORY	437.7	454.2	465.3	470.0	476.0	475.4	468.3	462.8	456.7	452.5
RELATIVE INVENTORY (years)[5]	4.9	5.0	4.8	4.7	4.6	4.5	4.4	4.3	4.1	4.0

[1] Excludes Communist areas
[2] Nuexco Report 172, Table 5
[3] This report, Table 9
[4] Nuexco estimate
[5] For each year, Relative Inventory equals the number of years of forward consumption which could be supplied by that year's Beginning Inventory.

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Table 15
SUPPLY-DEMAND BALANCE: US
ONE AND ONE-HALF YEARS DESIRED RELATIVE INVENTORY
(millions of pounds U_3O_8 equivalent)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
PRODUCTION[1]	25.9	14.7	12.0	12.4	12.3	12.0	12.4	12.6	13.4	16.9
less										
CONSUMPTION[2]	20.9	24.6	30.7	31.6	33.5	35.3	39.4	34.7	35.7	34.7
plus										
NET IMPORTS/(EXPORTS)[3]	3.5	6.0	3.0	1.7	1.9	1.9	2.3	2.4	2.4	2.4
equals										
SUPPLY SURPLUS/ (DEFICIT)	8.5	(3.9)	(15.7)	(17.5)	(19.3)	(21.4)	(24.7)	(19.7)	(19.9)	(15.4)
plus										
BEGINNING INVENTORY	138.8[4]	147.3	143.4	127.7	110.2	90.9	69.5	56.8	52.6	53.1
equals										
NOMINAL INVENTORY	147.3	143.4	127.7	110.2	90.9	69.5	44.8	37.1	32.7	37.7
less										
MINIMUM INVENTORY	33.2	40.0	46.5	48.4	51.2	55.0	56.8	52.6	53.1	52.2
equals										
EXCESS INVENTORY/ (UNFILLED DEMAND)	114.1	103.4	81.2	61.8	39.7	14.5	(12.0)	(15.5)	(20.4)	(14.5)
ADJUSTED ENDING INVENTORY	147.3	143.4	127.7	110.2	90.9	69.5	56.8	52.6	53.1	52.2
RELATIVE INVENTORY (years)[5]	4.9	4.8	4.3	3.7	3.1	2.5	1.9	1.5	1.5	1.5

[1] Report 172, Table 3
[2] This report, Table 9
[3] This report, Table 16
[4] Commercial inventory only. Nuexco Report 170, page 19, Table 3
[5] For each year, Relative Inventory equals the number of years of forward consumption which could be supplied by that year's Beginning Inventory.

Table 16
US URANIUM IMPORT-EXPORT BALANCE
(millions of pounds U_3O_8)
(contracted as of 9/30/82)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
IMPORTS										
Annual	9.5	9.9	5.4	3.7	3.3	2.4	2.4	2.4	2.4	2.4
Cumulative	9.5	19.4	24.8	28.5	31.8	34.2	36.6	39.0	41.4	43.8
EXPORTS										
Annual	6.0	3.9	2.4	2.0	1.4	0.5	0.1	0.0	0.0	0.0
Cumulative	6.0	9.9	12.3	14.3	15.7	16.2	16.3	16.3	16.3	16.3
NET IMPORTS										
Annual	3.5	6.0	3.0	1.7	1.9	1.9	2.3	2.4	2.4	2.4
Cumulative	3.5	9.5	12.5	14.2	16.1	18.0	20.3	22.7	25.1	27.5

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SUMMARY OF US URANIUM ACTIVITIES—1982

Drilling Activity

The continued decline in uranium exploration and development activities in 1982 can best be measured by comparing footage drilled in 1982 vs 1981. According to figures released by the US Department of Energy (DOE), 1981 drilling as reported by active companies totaled approximately 14 million feet for exploration and development projects. Based upon DOE's mid-1982 tabulation of less than three million feet, Nuexco is estimating that 1982 drilling will total 6 million to 6.5 million feet, less than half the 1981 total. Since labor and material costs have risen, the percentage decline in drilling expenditures will probably be somewhat less, about 40 to 45 percent below 1981.

The depressed market price for uranium concentrates is the principle reason given for companies pulling out of exploration and developing projects. Only the most favorable prospect areas have been retained in limited situations; otherwise, large property tracts have been completely dropped, including tracts with proven ore reserves. The major oil companies have led the exodus. After three major oil companies curtailed or terminated all uranium activities in 1981, there remained only fifteen oil companies aggressively pursuing uranium exploration and development projects as of January 1982. During the year, eight of them announced their intention to completely terminate uranium activities. The remaining seven have sharply curtailed their uranium activities. The smaller companies and independent operators have followed the trend. Termination of uranium activities, including many mining operations, has spread to all districts.

Overall, the potential uranium-bearing lands that have been dropped total hundreds of thousands of acres throughout the western US. The majority of acreage dropped consists of mining claims on public lands, many of which have been held for 20 to 25 years. The land has reverted to the public domain and is once again open to staking by any interested party. Other acreage dropped includes exploration and mining leases on privately-owned land.

The intensity of exploration and development activity has been cut back drastically in each district. The South Texas district, which was the most active for the last two years, well illustrates the state of US activity. In December 1981, there were about 23 companies active, 55 drills working and 13 producing projects. The count this December is ten active companies, 13 drills working, and 10 producing projects.

The situation is generally more critical in the other producing districts. New mine and mill construction has been postponed or abandoned; operating projects continue to cut back; and many companies have announced total abandonment of their uranium programs. According to information published by the Rocky Mountain Scout, there were 22 drills working on exploration projects as of December 1. Eighteen of those were drilling in Arizona, Nebraska and Wyoming. Of the three remaining drills, two were located in South Texas and one in the Grants Uranium Belt. This compares to 59 drills active on exploration projects one year earlier.

There were 26 drills operating on property development programs according to the same report. The main areas of activity were South Texas, where 11 rigs were drilling on 6 producing properties, Colorado Front Range, where 6 drills were located on one producing property, and Wyoming, where two rigs were drilling on a producing property and two on delineation of an undeveloped orebody. One year ago, there were a total of 41 operating drills scattered throughout the different producing districts.

Resource Estimates

The availability of reasonably assured uranium resources (RAR) in the US has been reduced considerably as a result of the sustained market price decline that occurred in 1979-1982. Nuexco published its assessment of uranium reserves in a forward cost category of $20 or less per pound U_3O_8 in August 1982 (Nuexco Report 168) based on annual reserve figures released by USDOE as of January 1, 1982. DOE reclassified all reasonably assured resources (RAR) in the cost category of $15 or less per pound into the $30 or less cost category. The DOE estimate of RAR at $30 or less is 186,000 tonnes U_3O_8, a reduction of 56 percent below RAR as of January 1, 1981. Nuexco estimates RAR at $20 or less per pound at approximately 15,000 tonnes U_3O_8. This is less than 10 percent of the DOE estimate for RAR at $30 or less. However, it is noteworthy that Nuexco's estimate does not include newly discovered and totally undeveloped ore deposits which have yet to demonstrate favorable recovery techniques at competitive cost levels. In particular, the Crow Butte deposit in Nebraska and the Swanson deposit in Virginia are not yet included as RAR. Combined, the two deposits represent a potential to increase Nuexco's RAR estimate by about 34,000 tonnes U_3O_8.

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Major Commercial Events

The discovery of uranium in Pittsylvania County, Virginia, highlighted US exploration activity for 1982. **Marline Uranium Corporation**, a wholly-owned subsidiary of the Marline Oil Corporation, announced on July 21 the discovery of at least 30 million pounds U_3O_8 at an average grade exceeding four pounds U_3O_8 per ton of ore. In addition, large quantities of lower grade ore were identified in association with the main ore deposit. The discovery was important because it increased US reserves, but perhaps more importantly, it identified a new uranium province in the US, the first such discovery in the last 20 years. There is high potential to discover additional uranium deposits within the same geologic province.

Marline Uranium Corporation began exploration in the general area in 1977. Exploration drilling began in 1978 and the main discovery was made in 1979. Delineation of the orebody, named the Swanson deposit, required the drilling of more than 240 holes totaling over 124,000 feet. The mineralization occurs in metasediments (gniess) of the Fork Mountain Formation which is Precambrian-Lower Paleozoic in age. The ore occurrence is adjacent to the Chatham Fault, the major structural feature separating the older rocks from downfaulted Triassic sediments along the Danville Triassic Basin frontal system to the east.

Marline geologists discovered uranium on the surface at the discovery site. Drilling indicates the orebody plunges to the southeast to a depth exceeding 1000 feet. Pitchblende is the principal uranium mineral present in veins and fractures, and as discrete crystals dispersed within the granulated groundmass of the Fork Mountain Formation.

Marline Uranium Corporation of Danville, Virginia, and Union Carbide Corporation of Danbury, Connecticut, announced on December 9 an agreement between the two companies to evaluate uranium mineralization on properties that Marline has under lease in Pittsylvania County, Virginia. The two companies will jointly determine the economic feasibility of extracting and processing uranium ores from those properties. If the study results are favorable, Union Carbide has the option to develop this resource with Marline.

* * *

Ore reserves at the **Crow Butte** project, located in the northwest corner of Nebraska, have almost doubled since the discovery was announced in 1981. Independent ore reserve studies indicate an orebody containing over 44 million pounds U_3O_8, according to information published by joint venture partners Ferret Exploration Company (50 percent) and Wyoming Fuel Company, subsidiary of Kansas-Nebraska Natural Gas Company (50 percent). Uranium mineralization occurs in a paleochannel formed in basal units of the White River Formation of Tertiary age. The joint venture controls almost 90,000 acres in the area of interest.

Engineering and metallurgical studies indicate the deposit is amenable to solution mining techniques. The joint venture is progressing with development plans to construct a 100 gallon per minute in situ leach pilot plant to commence operations by the end of 1983. Assuming the pilot project is successful, development plans include permitting and construction of a commercial plant sometime in 1985 or 1986. Commercial production could total approximately one million pounds U_3O_8 annually, expanding to about two million pounds per year by the late 1980s.

* * *

Of interest throughout the uranium industry was the acquisition of 80 percent of **Pathfinder Mines, Inc.** by **French American Metals Corporation**, a wholly-owned subsidiary of Compagnie Generale des Matieres Nucleaires (Cogema). Pathfinder's parent company, Utah International Inc., announced on March 26 that the transaction encompassed all of Pathfinder's uranium interests, including two surface mines and a mill in the Gas Hills district and one mine and mill in the Shirley Basin district in Wyoming. Cogema has a five-year option to acquire the remaining 20 percent of Pathfinder. According to the announcement, the operating procedures of Pathfinder will not change in the near future. Present production is dedicated to long-term supply contracts with domestic and foreign utilities.

* * *

Other 1982 events that have had an effect on the US uranium industry are listed chronologically in Table 17.

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Table 17

1982 US URANIUM DEVELOPMENTS

Date	Company	Event
January	Atlas Corp.	Cutback in Utah mining and milling operation. About 34% of employees to be terminated.
January	Exxon	To discontinue uranium exploration. At Highland, Wyoming, surface mine and mill production will be reduced about 35 percent; the underground mine will be closed.
February	Western Nuclear Inc.	Reduced all mining and milling operations to four days per week.
February	Anaconda Co.	Made last ore shipment from the Jackpile mine area after 30 years' continuous production.
February	Wyoming Fuel Co.	Announced Crow Butte probable and potential ore reserves to be greater than 25 million pounds U_3O_8.
March	New Mexico & Arizona Land Co.	Let 40% interest in the Ruby #3 and #4 Mines, Grants Uranium Belt, N.M., revert to Western Nuclear.
March	US Congress	Domenici-sponsored amendment to NRC budget authorization bill to limit US utilities to 20% foreign uranium for fuel in each reactor passed the Senate vote. Amendment was forwarded to conference committee for review.
March	Union Carbide Corp.	Announced 5-month shutdown of Uravan, Colorado mill beginning mid-April.
April	Exxon Co.	Last ore shipment from Felder mine, Tx. Deposit considered mined-out.
April	Energy Fuels Ltd.	Received NRC authorization to produce up to 17,300 pounds U_3O_8 daily at its White Mesa, Utah, mill.
April	Plateau Resources Ltd.	Start-up of its Shootaring Canyon, Utah mill. Rated capacity equals 750 tons per day.
May	Homestake Mining Co.	Announced Ambrosia Lake, N.M. mill to cut operations from 5 to 4 days per week. Production to remain at same rate.
May	Gulf Oil Corp.	Transferred its Canadian uranium position to Eldorado for undisclosed amount uranium oxide.
May	UNC Resources	Announced suspension of production at Church Rock, N.M. mines and mill.
May	Conoco Inc.	Applied to EID of N.M. for permit to develop in situ leach project and a 1500 tpd mill at Crownpoint, N.M.
May	Gulf Mineral Resources Co.	Suspended further development of Mt. Taylor, N.M. mine. Production will continue at 400-500 tpd.
May	TVA	Announced plans to initiate mining on properties at Edgemont, S.D. between 1988 and 1991.

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Table 17

1982 US URANIUM DEVELOPMENTS

Date	Company	Event
June	Exxon Co.	Planned phase-out of Highland, Wyoming project in 1983.
June	Gulf Mineral Resource Co.	Closed its mine at Mariano Lake, N.M.
June	Kerr-McGee Corp.	Development work on the Lee mine shaft, Ambrosia Lake, N.M., was suspended for 3 years.
June	Sunedco	Discontinuing its uranium exploration program.
July	Western Nuclear Inc.	Announced Ruby #3 and #4 Mines in the Grants Uranium Belt, N.M., and the Sherwood, WA mine and mill will be placed on standby.
July	Phillips Petroleum Corp.	Announced phase-out of all mineral projects, including uranium, by September.
July	Conoco, Inc.	Announced intention to terminate all mineral projects, including uranium.
July	Marline Uranium Corp.	Announced the discovery of 30 million pounds U_3O_8 in southern Virginia.
August	Kerr-McGee Corp.	Reduced operations in Ambrosia Lake by 30 percent.
August	Plateau Resources Ltd.	Announced the Shootaring Canyon, Utah mill would be closed immediately.
August	Atlas Corp.	Purchased Exxon's Shootaring Canyon property and ore reserves for royalty on future production.
August	Union Carbide Corp.	Will not reopen Uravan, CO, mill in September as planned.
August	Texaco Inc.	Began phase-out of uranium exploration activities.
September	Pioneer Nuclear, Inc.	Received radioactive materials license for its Slick Rock, CO, mill. Development plans are on standby.
September	Sohio Western Mining Co.	Negotiated termination of the L-Bar Joint Venture with Reserve Oil & Mineral Corporation.
September	Sohio Western Mining Co.	Radioactive materials license renewed for the Seboyeta, N.M. mill.
September	Union Carbide Corp.	Cutback on mining at Gas Hills, WY. Milling to continue.
October	Earth Sciences, Inc.	Sold 49 percent interest in uranium recovery plant (from phosphate) in Calgary, Alberta, to UG Canada.
October	Anaconda Co.	The Texas Department of Health has issued a radioactive source materials license for the Rhode Ranch project, South Texas.
October	Sohio Western Mining Co.	To phase out all uranium exploration. L-Bar project delegated to Kennecott Copper Corp.

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Table 17

1982 US URANIUM DEVELOPMENTS

Date	Company	Event
November	Gulf Mineral Resources Corp.	Reported a temporary halt of production at its Mt. Taylor, N.M. mine.
November	Union Carbide Corp.	Cutback on mining schedule in western Colorado and eastern Utah.
November	Dawn Mining Co.	Shut down milling operations, Ford, WA.
November	Kerr-McGee Corp.	Announced a 20 percent cutback in mining operations at Church Rock, N.M. Mill at Ambrosia Lake operating 8 days on, 6 days off.
December	US Congress	Passed revised version of NRC budget authorization bill which limits bill to study impact of uranium imports on domestic industry. Domenici import quota dropped from bill.
December	TVA	Purchased about 17,000 acres in Natrona and Fremont Counties, WY, from Federal-American partners.
December	Marline Uranium Corp.	Announced agreement with Union Carbide Corp. to jointly evaluate the Swanson orebody in Pittsylvania County, VA.

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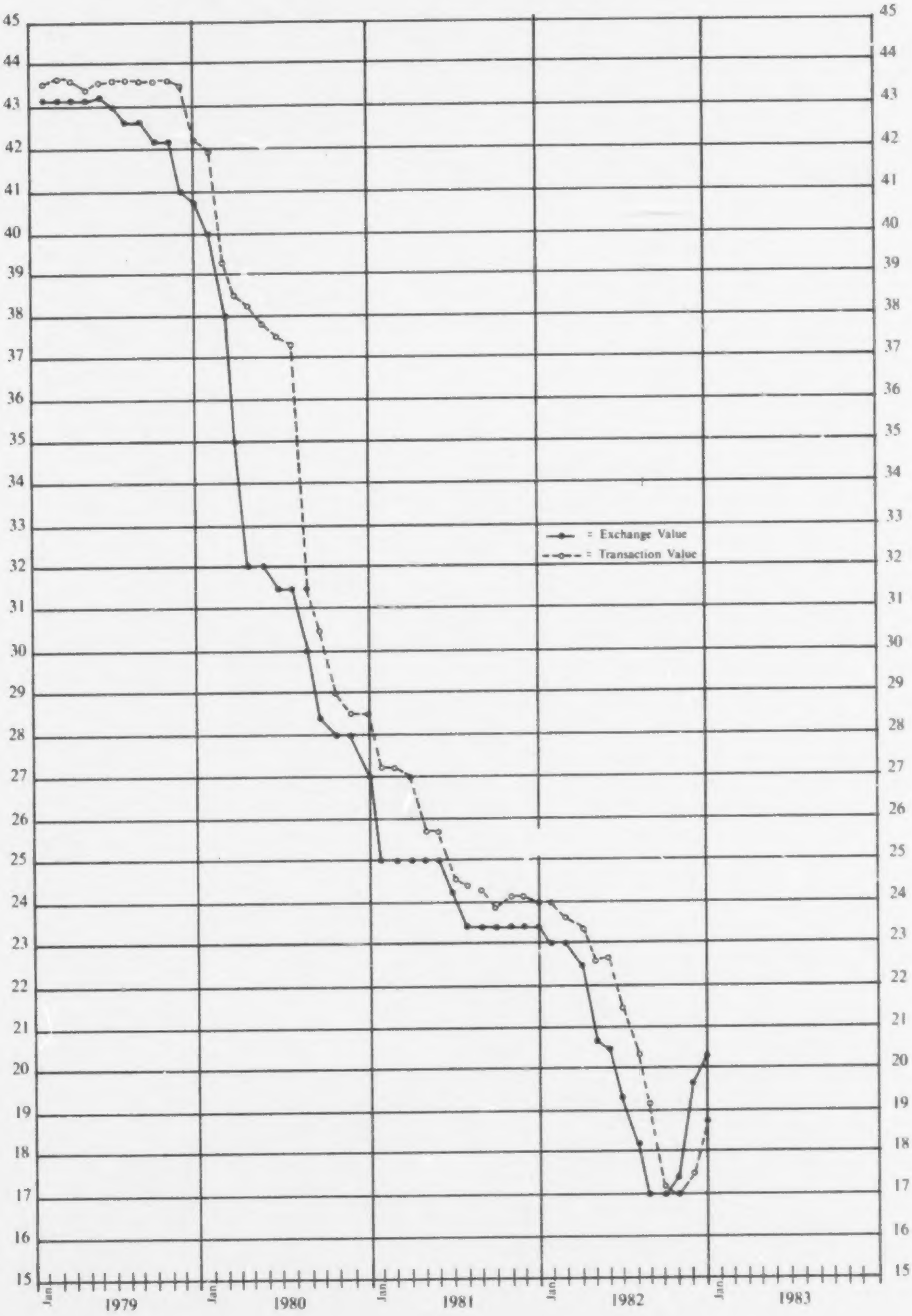
EXCHANGE AND TRANSACTION VALUES SINCE JANUARY 1979

Determined as of the last day of the month indicated



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HISTORICAL MARKET DATA

HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	**20.25**

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	**18.80**

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country	per lb. U_3O_8 in Concentrates	per kg U_3O_8 in Concentrates	per kg U in Concentrates
US (dollar)	20.25	44.64	52.65
France (franc)	136.00	299.82	353.56
FRG (mark)	48.09	106.02	125.02
Japan (yen)	4,732	10,433	12,303
Switzerland (franc)	40.40	89.06	105.02
UK (pound)	12.48	27.51	32.44
Australia (dollar)	20.62	45.46	53.61
Canada (dollar)	25.06	55.25	65.15
Niger, Gabon (CFA)	6,795	14,981	17,666
South Africa (rand)	21.76	47.98	56.58
Sweden (kroner)	147.49	325.15	383.43

[1] Calculated using currency exchange rates published in the Wall Street Journal on December 20, 1982.

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AUSTRALIA

	Price Index of Materials Used in Manufacturing Industry—All Groups (Year 1968-69 = 100.0)[1]	Weighted Average Minimum Weekly Wage Rates—Adult Males Australia Mining and Quarrying (A$)[2]
Annual Avg. 1971[3]	101.5	65.95
Annual Avg. 1972[3]	105.6	71.26
Annual Avg. 1973[3]	124.4	78.96
Annual Avg. 1974[3]	141.9	108.07
Annual Avg. 1975[3]	150.4	132.55
Annual Avg. 1976[3]	168.4	160.93
Annual Avg. 1977[3]	192.0	179.03
Annual Avg. 1978[3]	198.5	190.04
Annual Avg. 1979	248.8	196.34
Annual Avg. 1980	321.8	218.00
Annual Avg. 1981	355.3	237.34
Jul 1981	357.8R	237.86
Aug 1981	360.9R	154.1 R[2]
Sep 1981	358.4R	154.4 R[2]
Oct 1981	352.5R	155.0 R[2]
Nov 1981	351.3	156.8 R[2]
Dec 1981	349.9	166.6 R[2]
Jan 1982	354.9	168.2 R[2]
Feb 1982	356.7	168.9 R[2]
Mar 1982	360.3	169.2 R[2]
Apr 1982	367.7	169.2 R[2]
May 1982	367.6	169.7 R[2]
Jun 1982	367.2	170.2 R[2]
Jul 1982	369.1	174.5 R[2]
Aug 1982	371.5	175.1 R[2]
Sep 1982	374.0R	175.3 P[2]
Oct 1982	377.2P	—

P = Preliminary   R = Revised since last month

[1] Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0), Table 3.

[2] Australian Bureau of Statistics, Canberra: "Wage Rates, Australia" (Catalogue No. 6312.0), Table 1. Figures are being converted to an Index number. As the data are converted, the new index numbers will be inserted.

[3] Monthly data for 1970 through 1978 appear on pages 4.7 and 4.8 of Nuexco Report 138.

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GOVERNMENT STATISTICS

CANADA

	Industry Selling Price Index: Manufacturing (D 500000)[1] [2] (1971 = 100.0)	Wage-earner Data: Average Hourly Earnings (C$)[3] [4]		
		Metal Mining, including Milling (SIC 050-059)	**Primary Metal Industries, non-ferrous (SIC 296-298)**	**Chemicals and Chemical Products (SIC 370-379)**
Annual Avg. 1978	190.4	8.76	6.82	6.97
Annual Avg. 1979	217.9	9.60	7.35	7.67
Annual Avg. 1980	247.2	10.59	8.05	8.50
Annual Avg. 1981	272.3P	12.02	9.03	9.53
Oct 1981	279.3	12.78	9.35	9.91
Nov 1981	278.8	12.89	9.45	9.89
Dec 1981	280.0	12.87	9.42	10.03
Jan 1982	281.9	13.14	9.53	10.11
Feb 1982	283.5	13.25	9.60	10.19
Mar 1982	284.8	13.34	9.62	10.35
Apr 1982	287.7R	13.46	9.79	10.48
May 1982	288.8R	13.56	9.88	10.62
Jun 1982	289.7R	13.71	9.92	10.69
Jul 1982	290.3R	13.71R	10.05	10.73R
Aug 1982	290.0R	13.88R	10.01R	10.78R
Sep 1982	292.3R	13.92P	10.23P	10.68P
Oct 1982	291.8	—	—	—

P = Preliminary R = Revised since last month

[1] Statistics Canada, Prices Division, Ottawa; "Industry Price Indexes" (Catalogue 62-011), Table 1. Indexes for the most recent six months shown are subject to revision.

[2] Monthly data for 1973 through 1978 appear on page 4.10 of Nuexco Report 138.

[3] Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa; "Employment, Earnings and Hours" (Catalogue 72-002), Table 2.

[4] Monthly data for 1977 and 1978 appear on page 4.11 of Nuexco Report 138.

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REPUBLIC OF SOUTH AFRICA

	Average Declared Working Costs per Metric Ton of Gold Ore Milled (Rand)[1]	Consumer Price Index[2] (1975 = 100, except where otherwise indicated)	Producer[5] Price Index All Groups (1975 = 100)	Total Employment in Mining and Quarrying (Code 35)[7]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand) (Code 40)[7]
Annual Avg. 1971[3]	7.88	106.4[4]	59.1	652,294	415,956
Annual Avg. 1972[3]	8.79	113.3[4]	63.9	623,067	443,933
Annual Avg. 1973[3]	10.51	124.1[4]	72.3	684,743	572,133
Annual Avg. 1974[3]	13.18	138.5[4]	85.3	674,140	761,596
Annual Avg. 1975[3]	16.71	157.2[4]	100.0	639,473	1,003,617
Annual Avg. 1976[3]	19.30	174.7[4]	115.1	671,240	1,212,983
Annual Avg. 1977[3][6]	23.87	194.4[4]	130.0	712,006	1,420,670
Annual Avg. 1978[3][6]	27.14	137.2	142.7	664,571	1,537,169
Annual Avg. 1979[3][6]	30.18	155.3	164.5	692,209	1,830,632
Annual Avg. 1980[6]	35.53	176.7	192.1	714,379	2,279,615
Annual Avg. 1981	41.89	206.5R	218.3	728,506	2,820,505
May 1981	—	197.7	213.2	726,869	219,880
Jun 1981	40.41	200.0	215.3	728,506	237,049
Jul 1981	—	204.6	218.4	735,839	249,080
Aug 1981	—	208.0	222.6	722,684	245,817
Sep 1981	43.28	211.6	224.6	724,604	251,502
Oct 1981	—	213.4	227.0	717,918	248,159
Nov 1981	—	214.8	229.4	720,255	253,044
Dec 1981	44.52	216.3	230.4	709,612	257,655
Jan 1982	—	217.6	233.1	700,375	257,173
Feb 1982	—	220.2	236.8	705,992	250,191
Mar 1982	45.49	225.2	237.4	725,700	262,210
Apr 1982	—	228.9	241.9	707,502	252,562
May 1982	—	230.3	244.8	715,162	258,770
Jun 1982	45.77	232.1	246.7	707,552	261,361
Jul 1982	—	234.1	249.4	702,141	283,248
Aug 1982	—	236.8	253.4	705,562	276,730
Sep 1982	48.04	241.0	255.0	704,490	281,331
Oct 1982	—	243.9	260.1	—	—

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[1] Chamber of Mines of South Africa, Johannesburg; "Analysis of Working Results," published quarterly.

[2] Republic of South Africa Department of Statistics, Pretoria; "Government Gazette: Consumer Price Index for Urban Areas."

[3] Historical data for the Average Declared Working Costs and Consumer Price Index 1970-1979 appear on page 4.9 of Nuexco Report 140.

[4] April 1970 = 100.00.

[5] Previously known as the WHOLESALE PRICE INDEX, now the PRODUCER PRICE INDEX. The computation remains the same.

[6] Historical data for Codes 35 and 40 1977-1980 appear on page 28 of Nuexco Report 157.

[7] Bulletin of Statistics, Department of Statistics, Pretoria.

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GOVERNMENT STATISTICS

UNITED STATES

	Producer Price Index—Industrial Commodities (1967 = 100)[1]	Producer Price Index—All Commodities (1967 = 100)[1]	Consumer Price Index (1967 = 100)[2]	GNP Implicit Price Deflator (1972 = 100)[3]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[4]			
					Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
Annual Avg. 1971[5]	114.1	114.0	121.3	96.01	4.12	4.15	3.97	3.49
Annual Avg. 1972[5]	117.9	119.1	125.3	100.00	4.56	4.59	4.26	3.71
Annual Avg. 1973[5]	125.9	134.7	133.1	105.75	4.84	4.98	4.51	3.91
Annual Avg. 1974[5]	153.8	160.1	147.7	115.08	5.44	5.63	4.88	4.21
Annual Avg. 1975[5]	171.5	174.9	161.2	125.79	6.13	6.24	5.39	4.64
Annual Avg. 1976[5]	182.4	183.0	170.5	132.34	6.76	6.87	5.91	4.96
Annual Avg. 1977[5]	195.1	194.2	181.5	140.05	7.28	7.67	6.43	5.39
Annual Avg. 1978[5]	209.4	209.3	195.4	150.42	8.23	8.56	7.02	5.82
Annual Avg. 1979[5]	236.5	235.6	217.4	163.42	9.27	9.50	7.60	6.32
Annual Avg. 1980[5]	274.8	268.8	246.8	178.64	10.26	10.63	8.30	6.94
Annual Avg. 1981	304.1	293.4	272.4	195.51	11.55	11.98	9.12	7.62
Nov 1981	309.3	295.5	280.7	—	12.12	12.48	9.42	7.83
Dec 1981	310.0	295.8	281.5	201.55	12.08	12.45	9.53	7.90
Jan 1982	311.7	298.2	282.5	—	12.19	12.66	9.68	7.98
Feb 1982	311.4	298.5	283.4	—	12.22	12.61	9.68	7.96
Mar 1982	311.0	298.0	283.1	203.68	12.29	12.69	9.71	8.01
Apr 1982	309.9	298.0	284.3	—	12.23	12.68	9.81	8.03
May 1982	309.6	298.6	287.1	—	12.25	12.71	9.83	8.05
Jun 1982	310.6	299.3	290.6	205.98	12.26	12.91	9.95	8.09
Jul 1982	312.8R	300.4R	292.2	—	12.23	12.91	10.02	8.18
Aug 1982	313.4P	300.4P	292.8	—	12.29	12.97	10.03	8.24
Sep 1982	312.9P	299.5P	293.3	208.51R	12.53R	13.46R	10.20R	8.31R
Oct 1982	314.4P	299.9P	294.1	—	12.45P	13.24P	10.24R	8.34R
Nov 1982	315.1P	300.4P	293.6	—	—	—	10.25P	8.39P

P = Preliminary R = Revised since last month

[1] US Bureau of Labor Statistics, Washington, D.C.; "Producer Prices and Price Indexes," Table 6 (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents.

[2] US Bureau of Labor Statistics, Washington, D.C.; Consumer Price Index for All Urban Consumers, US City Average, All Items.

[3] US Department of Commerce, Washington, D.C.; Bureau of Economic Analysis, National Income and Wealth Division; "Survey of Current Business," Table A. The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted.

[4] US Bureau of Labor Statistics, Washington, D.C.; "Employment and Earnings," Table C-2. All data based on 1972 revision of SIC Manual. Data for 1970-1976 are adjusted to the March 1977 benchmark. Data for 1977-1978 are adjusted to the March 1979 benchmark. Data for January 1979 and beyond are adjusted to the March 1980 benchmark.

[5] Monthly data 1970-1978 for Producer Price Index-Industrial Commodities, Consumer Price Index, and Employment and Earnings SIC codes 10, 333, and 28, and quarterly data for GNP Implicit Price Deflator appear on pages 4.6-4.8 of Nuexco Report 139.
Monthly data 1977-1978 for Employment and Earnings SIC Codes 10, 333, and 28 appear on page 33 of Nuexco Report 147.
Monthly data 1970-1978 for Employment and Earnings SIC Code 36 appear on page 23 of Nuexco Report 154.
Monthly data 1979-1980 for Employment and Earnings, Revised Establishment Data, all listed codes, appear on page 22 of Nuexco Report 158.
Monthly data 1977-1980 for Producer Price Index-All Commodities, appear on page 21 of Nuexco Report 158.

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Table 18A

COST OF ENRICHED URANIUM (US $ per KgU as UF_6, 3 percent U_{235}) FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS (0.20% TA)

Feed Cost (US $ per KgU as Natural UF_6)	SWU Price (US $ per SWU)								
	90	95	100	105	110	115	120	125	130
40	606.75	628.29	649.82	671.35	692.88	714.42	735.95	757.48	779.01
45	634.15	655.68	677.22	698.75	720.28	741.81	763.35	784.88	806.41
50	661.55	683.08	704.61	726.15	747.68	769.21	790.74	812.28	833.81
55	688.95	710.48	732.01	753.54	775.08	796.61	818.14	839.67	861.20
60	716.34	737.88	759.41	780.94	802.47	824.01	845.54	867.07	888.60
65	743.74	765.27	786.81	808.34	829.87	851.40	872.93	894.47	916.00
70	771.14	792.67	814.20	835.73	857.27	878.80	900.33	921.86	943.40
75	798.53	820.07	841.60	863.13	884.66	906.20	927.73	949.26	970.79
80	825.93	847.46	869.00	890.53	912.06	933.59	955.13	976.66	998.19
85	853.33	874.86	896.39	917.93	939.46	960.99	982.52	1,004.06	1,025.59
90	880.73	902.26	923.79	945.32	966.86	988.39	1,009.92	1,031.45	1,052.99
95	908.12	929.66	951.19	972.72	994.25	1,015.79	1,037.32	1,058.85	1,080.38
100	935.52	957.05	978.59	1,000.12	1,021.65	1,043.18	1,064.72	1,086.25	1,107.78
105	962.92	984.45	1,005.98	1,027.52	1,049.05	1,070.58	1,092.11	1,113.65	1,135.18
110	990.32	1,011.85	1,033.38	1,054.91	1,076.45	1,097.98	1,119.51	1,141.04	1,162.57
115	1,017.71	1,039.25	1,060.78	1,082.31	1,103.84	1,125.37	1,146.91	1,168.44	1,189.97
120	1,045.11	1,066.64	1,088.18	1,109.71	1,131.24	1,152.77	1,174.30	1,195.84	1,217.37
125	1,072.51	1,094.04	1,115.57	1,137.10	1,158.64	1,180.17	1,201.70	1,223.23	1,244.77
130	1,099.90	1,121.44	1,142.97	1,164.50	1,186.03	1,207.57	1,229.10	1,250.63	1,272.16
135	1,127.30	1,148.83	1,170.37	1,191.90	1,213.43	1,234.96	1,256.50	1,278.03	1,299.56
140	1,154.70	1,176.23	1,197.76	1,219.30	1,240.83	1,262.36	1,283.89	1,305.43	1,326.96
145	1,182.10	1,203.63	1,225.16	1,246.69	1,268.23	1,289.76	1,311.29	1,332.82	1,354.36
150	1,209.49	1,231.03	1,252.56	1,274.09	1,295.62	1,317.16	1,338.69	1,360.22	1,381.75
155	1,236.89	1,258.42	1,279.96	1,301.49	1,323.02	1,344.55	1,366.09	1,387.62	1,409.15
160	1,264.29	1,285.82	1,307.35	1,328.89	1,350.42	1,371.95	1,393.48	1,415.02	1,436.55

OPTIMUM TAILS ASSAY FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS

(percent U_{235})

Feed Cost (US$ per KgU as Natural UF_6)	SWU Price (US $ per SWU)																
	90	95	100	105	110	115	120	125	130	138.65	140	149.85	160	170	180	190	200
40	.316	.322	.327	.333	.338	.343	.347	.352	.356	.363	.364	.372	.379	.385	.391	.397	.402
45	.302	.308	.314	.320	.325	.330	.334	.339	.343	.350	.351	.359	.366	.373	.379	.384	.390
50	.291	.297	.302	.308	.313	.318	.323	.327	.332	.339	.340	.347	.354	.361	.367	.373	.379
55	.280	.286	.292	.297	.302	.307	.312	.317	.321	.328	.329	.337	.344	.351	.357	.363	.368
60	.271	.277	.282	.288	.293	.298	.302	.307	.311	.319	.320	.327	.334	.341	.347	.353	.359
65	.262	.268	.273	.279	.284	.289	.294	.298	.302	.310	.311	.318	.326	.332	.339	.345	.350
70	.254	.260	.265	.271	.276	.281	.285	.290	.294	.301	.302	.310	.317	.324	.330	.336	.342
75	.246	.252	.258	.263	.268	.273	.278	.282	.287	.294	.295	.302	.310	.316	.323	.329	.334
80	.239	.245	.251	.256	.261	.266	.271	.275	.279	.287	.288	.295	.302	.309	.316	.322	.327
85	.233	.239	.244	.249	.254	.259	.264	.268	.273	.280	.281	.288	.296	.302	.309	.315	.321
90	.227	.232	.238	.243	.248	.253	.258	.262	.266	.274	.275	.282	.289	.296	.302	.308	.314
95	.221	.227	.232	.237	.242	.247	.252	.256	.260	.268	.269	.276	.283	.290	.296	.302	.308
100	.216	.221	.227	.232	.237	.242	.246	.251	.255	.262	.263	.270	.278	.284	.291	.297	.302

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Table 18B

COST OF ENRICHED URANIUM (US $ per KgU as UF_6, 3 percent U_{235}) FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS (0.20% TA)

Feed Cost (US $ per KgU as Natural UF_6)	SWU Price (US $ per SWU) 138.65	140	149.85	160	170	180	190	200
40	816.26	822.08	864.50	908.21	951.27	994.34	1,037.40	1,080.47
45	843.66	849.48	891.89	935.60	978.67	1,021.73	1,064.80	1,107.86
50	871.06	876.87	919.29	963.00	1,006.07	1,049.13	1,092.20	1,135.26
55	898.46	904.27	946.69	990.40	1,033.46	1,076.53	1,119.59	1,162.66
60	925.85	931.67	974.09	1,017.80	1,060.86	1,103.93	1,146.99	1,190.06
65	953.25	959.06	1,001.48	1,045.19	1,088.26	1,131.32	1,174.39	1,217.45
70	980.65	986.46	1,028.88	1,072.59	1,115.66	1,158.72	1,201.79	1,244.85
75	1,008.84	1,013.86	1,056.28	1,099.99	1,143.05	1,186.12	1,229.18	1,272.25
80	1,035.44	1,041.26	1,083.67	1,127.39	1,170.45	1,213.51	1,256.58	1,299.64
85	1,062.84	1,068.65	1,111.07	1,154.78	1,197.85	1,240.91	1,283.98	1,327.04
90	1,090.24	1,096.05	1,138.47	1,182.18	1,225.24	1,268.31	1,311.37	1,354.44
95	1,117.63	1,123.45	1,165.87	1,209.58	1,252.64	1,295.71	1,338.77	1,381.84
100	1,145.03	1,150.85	1,193.26	1,236.97	1,280.04	1,323.10	1,366.17	1,409.23
105	1,172.43	1,178.24	1,220.66	1,264.37	1,307.44	1,350.50	1,393.57	1,436.63
110	1,199.83	1,205.64	1,248.06	1,291.77	1,334.83	1,377.90	1,420.96	1,464.03
115	1,227.22	1,233.04	1,275.46	1,319.17	1,362.23	1,405.30	1,448.36	1,491.43
120	1,254.62	1,260.43	1,302.85	1,346.56	1,389.63	1,432.69	1,475.76	1,518.82
125	1,282.02	1,287.83	1,330.25	1,373.96	1,417.03	1,460.09	1,503.16	1,546.22
130	1,309.41	1,315.23	1,357.65	1,401.36	1,444.42	1,487.49	1,530.55	1,573.62
135	1,336.81	1,342.63	1,385.04	1,428.76	1,471.82	1,514.88	1,557.95	1,601.01
140	1,364.21	1,370.02	1,412.44	1,456.15	1,499.22	1,542.28	1,585.35	1,628.41
145	1,391.61	1,397.42	1,439.84	1,483.55	1,526.61	1,569.68	1,612.74	1,655.81
150	1,419.00	1,424.82	1,467.24	1,510.95	1,554.01	1,597.08	1,640.14	1,683.21
155	1,446.40	1,452.21	1,494.63	1,538.34	1,581.41	1,624.47	1,667.54	1,710.60
160	1,473.80	1,479.61	1,522.03	1,565.74	1,608.81	1,651.87	1,694.94	1,738.00

OPTIMUM TAILS ASSAY FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS

(percent U_{235})

Feed Cost (US$ per KgU as Natural UF_6)	SWU Price (US $ per SWU) 90	95	100	105	110	115	120	125	130	138.65	140	149.85	160	170	180	190	200
105	.211	.216	.222	.227	.232	.236	.241	.245	.250	.257	.258	.265	.272	.279	.285	.291	.297
110	.206	.211	.217	.222	.227	.231	.236	.240	.245	.252	.253	.260	.267	.274	.280	.286	.292
115	.201	.207	.212	.217	.222	.227	.231	.236	.240	.247	.248	.255	.262	.269	.275	.281	.287
120	.197	.202	.208	.213	.218	.222	.227	.231	.235	.242	.243	.250	.258	.264	.271	.277	.282
125	.193	.198	.204	.209	.213	.218	.222	.227	.231	.238	.239	.246	.253	.260	.266	.272	.278
130	.189	.194	.200	.205	.209	.214	.218	.223	.227	.234	.235	.242	.249	.256	.262	.268	.273
135	.185	.191	.196	.201	.205	.210	.214	.219	.223	.230	.231	.238	.245	.251	.258	.264	.269
140	.182	.187	.192	.197	.202	.206	.211	.215	.219	.226	.227	.234	.241	.247	.254	.260	.265
145	.178	.184	.189	.194	.198	.203	.207	.211	.215	.222	.223	.230	.237	.244	.250	.256	.261
150	.175	.180	.185	.190	.195	.199	.204	.208	.212	.218	.219	.227	.234	.240	.246	.252	.258
155	.172	.177	.182	.187	.192	.196	.200	.204	.208	.215	.216	.223	.230	.237	.243	.248	.254
160	.169	.174	.179	.184	.188	.193	.197	.201	.205	.212	.213	.220	.227	.233	.239	.245	.251

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FEBRUARY 1983 NUMBER 174

Monthly Report on the Nuclear Fuel Market

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MONTHLY REPORT ON THE URANIUM MARKET

February 1983 No. 174

R. WESLEY MILLER, *EDITOR*

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FOREWORD

Nuexco is pleased to announce the establishment of our Atlanta office and the transfer of Jerry Reaves, Vice President, to Atlanta.

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NATURAL URANIUM AND CONVERSION

The **Exchange Value** as of January 31, 1983 rose for the fourth consecutive month, to **$21.50** per pound U_3O_8, up $1.25 since last month. The sustained buying activity of the past six months diminished somewhat, to levels more familiar to followers of the spot and near-term markets. The *Current Market Data* section lists five uranium sales, containing a total of approximately 2.5 million pounds U_3O_8, *equivalent.* Two of the transactions involved uranium concentrates (U_3O_8), two involved natural uranium hexafluoride (UF_6), and one involved enriched UF_6.

* * *

Active spot and near-term supply of uranium (material offered at competitive prices, terms and other conditions) amounts to **9.4** million pounds U_3O_8, equivalent, up 7 percent from last month's level of 8.8 million. **Active spot and near-term demand** rose to **4.7** million pounds U_3O_8 equivalent, up 20 percent from last month. Therefore, the spot and near-term **supply-demand ratio** dropped slightly, to **2.0:1**.

* * *

The **Transaction Value** as of January 31, 1983 is **$19.35** per pound U_3O_8, up $0.55 from a month ago. The current Transaction Value includes 12 transactions involving a total of 5.4 million pounds U_3O_8 equivalent, and covers a period of three months.

* * *

The **Conversion Value** as of January 31, 1983 is **$1.20** per pound U as UF_6, down $0.25 from last month. **Active inquiries to sell** conversion services within one year total **3.3 million** pounds U, up approximately 25 percent since last month. **Active inquiries to buy** conversion services within one year held at last month's level of **220 thousand** pounds U as UF_6. There are no conversion transactions reported this month. A total of 10-15 million pounds of conversion services could become available in the coming months from six sources located both in Europe and the US. If fierce competition develops among these potential sellers for the extremely limited opportunities for secondary market conversion services, the Conversion Value could be subject to drastic swings in either direction.

* * *

The **Loan Use Charge Rate** remained at six percent per annum. The limited activity in the market is taking place at or near that level, but there are few participants.

* * *

The convergence of a number of different factors both individually and in combination has led to a complex situation in the spot and near-term uranium markets. These factors include:

1. Form of the uranium;
2. National origin of the uranium;
3. Physical location of the uranium;
4. Specifications of the uranium;
5. Size of the lots offered or sought;
6. Credibility of the buyers and sellers.

While none of these factors is new to the marketplace, it is unusual to have all of them present and interacting simultaneously. Thus, depending on the given situation, the influence of one or more of these factors may result in prices being paid which are higher or lower than the Exchange Value.

Recently, the simultaneous interaction of these factors has resulted in wider price distributions than have been typical. Under such circumstances, the Exchange Value will be in the range of this distribution. Premiums may be evident when a buyer requires specific tonnage, specific nationality, specific delivery date, specific delivery location, or category of seller, or some combination of the above. Similarly, discounts may be evident if quantity, form, nationality, delivery date or location is other than what is optimally desired. It is important to recall that the definition of Exchange Value presumes no particulars other than *uranium concentrates*. Thus, uranium in the form of natural or enriched UF_6 may command a premium or require a discount depending on individual circumstances and the values imputed to the conversion and enrichment components. And the disparity between such values imputed by buyer and seller, one buyer versus another or one seller versus another, can account for wide variations in perceived U_3O_8 price. Similar considerations apply to national origin, location, size and other variables.

ENRICHED URANIUM AND SWUs

January 1983

Although a number of 3.5-year DOE Requirements contract holders are seeking secondary market supplies for FY 1983, Nuexco is not presently aware of any DOE

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sellers willing to offer prices low enough to make contract terminations attractive. There are, however, large quantities of Eurodif SWU being offered at discounts of approximately $35 from DOE's AFC price. The prevailing discount for DOE FY 1983 SWU remains at approximately $25 from the AFC price. Sellers of DOE SWU for delivery in FY 84 continue to offer discounts of $28-$30 from DOE's AFC price (at .2 tails). The market for DOE SWU for FY 1985 and later has virtually disappeared while potential sellers await DOE's announcement of the terms and conditions of conversion to the FR contract.

1982 ANNUAL REVIEW

Introduction

The secondary market for enrichment services has undergone a fundamental change during the past one to two years. From a limited market characterized by assignments of Fixed-Commitment contracts from one US DOE customer to another, it has begun to develop into a truly worldwide secondary market. During 1982, utilities began making use of the secondary SWU market as an integral part of their overall fuel procurement strategy, much as they have been using the spot uranium and conversion markets. Many have expressed hope that the secondary market remains active for the long term.

Many of the factors driving this market are the same as those driving the U_3O_8 and conversion markets. Overoptimistic demand projections, contracting far in advance of need, reactor cancellations and deferrals, supply overcapacity, inventory accumulation, and high carrying costs combined to produce in many market participants—utilities, in this case—a strong desire to sell their excess inventories. This article will review how the secondary SWU market developed to this point, and comment on how this new market may be affected by future events.

Early Development of the Secondary SWU Market

It was the introduction of the AFC contract combined with DOE's reopening of the order books that first created an active secondary SWU market. DOE chose to provide contract relief to customers through liberalized schedule adjustment provisions when LTFC contracts were converted to the AFC form under the July 1, 1978 option. Some DOE Fixed-Commitment customers suddenly found themselves able to seek new supply for years when others less fortunate were still stuck with excess commitments. DOE's policy allowing customers to reduce the amount of SWUs taken directly from DOE by the same amount of DOE SWU obtained on the secondary market was used extensively to the apparent advantage of both buyers and sellers as new schedules of commitments were drawn up. As reactor cancellations and deferrals increased the excess of SWU supply, new demand entered the market with the signing of new DOE contracts. Thus, some of the new contracts could be partially filled by assignments of other utilities' excess SWU.

The discounts available for secondary market transactions (assignments from one holder of a US DOE fixed-commitment contract to another) during the 1978-1979 time period were in the range of $2 to $5 per SWU for all fiscal years. This would seem to indicate that the market supply and demand were approximately in balance. However, the level of discounts was misleading. The market was in its infancy, there was little market information available, and the level of sophistication among market participants was low. Almost all accepted the transactions that were brought to them without argument, apparently feeling that they would be unable to complete the required contracting and interface with DOE without outside assistance.

As the market has developed, market participants' increasing sophistication and the better information produced by open competition in the marketplace have reinforced one another. Discounts have become more representative of market factors, such as the amount of DOE termination charges and the balance of supply and demand, instead of being determined arbitrarily in the absence of adequate information.

The Variable Tails Assay Option (VTAO) also facilitated the development of the secondary SWU market. Falling U_3O_8 prices made the higher tails assays available under the VTAO more valuable than the 0.20 percent tails assays mandated under Requirements contracts. Nuexco's analysis of the VTAO's effect on the secondary SWU market, published in Report 171, is reprinted immediately following this article.

The first signs of the factors which would be responsible for the sweeping changes in this market environment became evident by the beginning of 1980. By that time, most schedule adjustments and conversions to AFC contracts had already been completed. As the market for new reactor orders had virtually ground to a halt, very few new enrichment contracts were being

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signed. Thus, the demand for short-term SWU dropped dramatically and the primary customers for assignments of US DOE AFC SWUs withdrew from the market.

In order to stimulate new demand, sellers increased the discounts they were offering. At the same time, the continual reactor construction delays fed more and more new short-term supply into the market. A number of short-term sellers, frustrated in their attempts to sell, eventually began actively soliciting buyers. A few short-term *buyers* who had become sophisticated enough to perceive their market advantage decided to seek supply through open bidding.

Those buyers were able to obtain discounts of more than $20 per SWU through such open bidding. These transactions were widely reported, and other buyers began demanding and receiving similar discounts. Since then, open bidding by buyers and sellers has become the rule on the secondary SWU markets, just as in the uranium and conversion markets.

Still, through 1980, the secondary SWU market was characterized almost completely by sales from one DOE fixed-commitment customer to another. It was far from a true spot market. During that period, standard utility practice called for buyers to automatically contract well in advance with DOE for enrichment services sufficient for the entire life of a planned project. Most buyers looked on the secondary market only as a tool to assist them with that function.

Many buyers soon found themselves reentering the market as sellers due to their having bought new long-term commitments on the secondary market for reactors that were soon thereafter delayed further or cancelled. Although contract assignments had helped to relieve the SWU supply-demand imbalance *temporarily*, the continuation of apparently conservative purchasing practices had caused the SWU supply-demand imbalance to worsen in the *long term*.

Development of the Market During 1981-1982

Continued reactor delays aggravated the short-term oversupply of SWU on the secondary market. The more open exchange of information in the secondary market enabled it to respond in classic fashion—prices dropped, in the form of discounts greater than $30 per SWU from DOE's AFC price. During 1981, the discounts reached a level that made it profitable for certain DOE customers (holders of DOE requirements contracts having 3.5-year termination provisions) to terminate both short-term and long-term commitments and buy replacement DOE Fixed Commitment SWU on the secondary market.

At first, buyers were only willing to terminate after they had already found replacement SWU on the secondary market. Some buyers would try to terminate only a current delivery, in effect terminating their requirements contracts on a year-to-year basis for a relatively small monetary gain. Other buyers terminated long term, in effect choosing to exchange the flexibility of the requirements contract for the increased savings made available by the fact that DOE termination charges decrease with time. Several distinct stages of market development were evident:

1. Near the end of 1981 and continuing into 1982, some of DOE's *overseas* customers holding requirements contracts with 3.5 year termination provisions began terminating some of their SWU requirements scheduled for delivery 18 to 24 months later and replacing them with attractively discounted SWUs from other sources, such as Eurodif or Techsnabexport.

2. Later in the year, some of DOE's *US* customers holding requirements contracts having 3.5 year termination provisions began terminating some of their SWU requirements scheduled for delivery 18 to 24 months later and replacing them with SWU from LTFC or AFC contracts. In both this case and the previous one, sellers terminating their DOE SWU contracts acted simultaneously to effect any necessary replacement, so as to accept zero risk of supply.

3. The next phase in the development of the secondary SWU market saw both US and overseas DOE customers holding requirements with 3.5 year termination provisions begin terminating their DOE commitments with very short notice, 6-12 months, and replacing them with highly discounted AFC SWUs from any other DOE customer. As sellers of excess AFC SWUs had filled demand from potential buyers who were willing to terminate their requirements contracts with relatively long notice periods, and the correspondingly modest termination charges, the selling had become more difficult. In order to stimulate more demand, those same sellers raised discount levels even further. The higher discounts enabled buyers to execute a risk-free transaction and still make a profit, even after paying the higher termination charges associated with short notice.

4. Eventually, however, and importantly for the development of the market, in 1982 a number of US buyers, having done such a transaction once or twice, became willing to terminate DOE requirements contracts long term and intentionally go short. They are

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expecting to contract for replacement SWU only when their actual requirements become known, counting on the secondary market as a later source of supply.

Meanwhile, European buyers' enriched uranium inventories were continuing to increase due to contractual overcommitments to primary suppliers in Europe, which were almost three times actual expected reactor requirements of the customer utilities. European sellers began approaching US DOE customers, but initially with no success. There was still a large amount of DOE SWU available on the market, although at a slightly lower discount, and taking foreign SWU was initially perceived by US utilities to be too great a risk.

By the end of 1982, however, the flood of new requirements contract buyers had used up almost all available DOE secondary market SWU for short-term delivery at high discounts. There was not enough secondary market DOE SWU available to meet the demand of those requirements contract holders who had not yet terminated 1983 deliveries and wished to do so. The attempts to sell Eurodif SWU into the US began to meet with some success. Buyers either had to stay with the requirements contracts, or purchase non-DOE SWU. A number made the decision to purchase foreign SWU.

The new DOE Facility Requirements (FR) contract, introduced during 1982, is the largest uncertainty in the secondary SWU market. Termination charges under the FR have been designed to be prohibitive, so that wholesale conversion to the FR would virtually eliminate US DOE customers as potential buyers of non-DOE secondary market SWUs. However, DOE has not yet announced the terms and conditions of conversion to the FR, such as the range of schedule adjustments which will be allowed and the costs thereof. Those terms and conditions will help shape the future development of the market.

Future Development of the Market

The secondary SWU market is beginning to be viewed by at least some participants as a true spot market, another tool to be used along with long-term contracting as part of an overall strategy to minimize fuel costs. Whether the market will indeed develop to the point of being widely used for this purpose depends upon SWU supply for the long term remaining available on the secondary market.

Worldwide enrichment capacity will exceed expected reactor requirements far into the future. The critical question is whether this excess capacity will be translated into excess commitments that find their way to the secondary market.

The introduction by DOE of the FR contract constitutes the most serious threat to the long-term continuance of a strong secondary SWU market driven by excess DOE commitments. The FR contract's two-year rolling firm commitment period (as against the AFC contract's five years) indicates that, should most AFC customers convert as expected, the quantity of excess DOE SWU available in the secondary market will diminish drastically. Some excess commitments will continue to exist due to unexpected reactor delays, but customers will not be faced with the possibility of building up years of unneeded inventory for a reactor that has not yet begun to operate. Therefore, the economic incentive to sell on the secondary market as against simply buying and holding inventory will be reduced substantially.

On the other hand, the continued buildup of enriched inventories in Europe, caused by the overcommitments of the various Eurodif partners, strongly implies that a large surplus of non-DOE SWU will become available for sale long term on the secondary market. The vast majority of potential buyers remain the DOE 3.5 year requirements contract holders. The vast majority of these DOE customers are in the United States, so they effectively dominate the buy side of the market. Conversely, European holders of excess SWU will control the sell side of the market.

Whether the secondary SWU market remains active for the long term, as many active buyers hope, or instead proves to be a short-term anomaly, depends primarily on the acceptability of non-DOE SWU to those same US buyers. At present, it appears that most US buyers, while still preferring DOE secondary market supply, would much rather take the perceived risk of buying foreign SWU than give up the economic advantages of participating in the secondary market altogether. The next significant market development could easily be the termination, both with short notice and longer term, of DOE requirements contracts and their replacement with non-DOE SWUs for the longer term.

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THE VARIABLE TAILS ASSAY OPTION: ITS SIGNIFICANCE TO THE SECONDARY SWU MARKET

Nuexco's brokerage experience indicates that the availability of the VTAO has encouraged the existence of an active secondary market in SWU. The VTAO has had the following commercial effects:

1. It has effectively reduced the economic penalty of selling SWU. Without the VTAO, some utilities having excess SWU commitments would decide simply to hold enriched uranium inventory. Having the option to vary their tails assay, those same utilities now find it economic to sell at the somewhat lower discounts necessary to complete a transaction at a higher tails assay.
2. It has enabled more utilities holding DOE requirements contracts to obtain the effective discounts necessary to economically terminate and buy replacement DOE SWU on the secondary market.

An example will illustrate the use of the VTAO to facilitate a secondary market SWU transaction:

1. Utility A, wishing to dispose of excess SWU commitments, has elected a tails assay for its fiscal year 1983 (FY83) deliveries of 0.28 w/o (weight percent) under the VTAO.
2. Utility B, holding a 3.5 year termination requirements contract, decides to partially terminate its minimum expected requirements for FY83 of 100,000 SWU and buy the replacement SWUs from Utility A. Utility B pays DOE a termination charge of $37.46 for each SWU terminated (25 percent of the requirements contract price, $149.85 per SWU).
3. Utility B, just to break even, must therefore receive an effective SWU price of $112.39 per SWU ($149.85-$37.46).
4. In order to have some incentive to complete the transaction, Utility B decides it needs an additional discount of $3 per SWU, or a price of $109.39.
5. Therefore, if Utility A were selling SWU at a tails assay of 0.20 w/o, Utility A would need to offer a discount of $29.26 off the Adjustable Fixed Commitment (AFC) price per SWU ($138.65-$109.39).

Since Utility A is offering 0.28 w/o tails rather than .2 tails, however, the discount offered will be significantly less than $29.26, depending on the enriched product assay Utility B wants, as well as the marginal cost of UF_6 feed. *Note that Utility B's historical cost of feed does not affect the calculation, only the marginal cost of buying additional feed (in place of SWU) on the open market.*

Assuming that Utility B wants an enriched product assay of 3.4 percent, and that the marginal cost of feed in the spot market is $48 per KgU, the discount offered by Utility A could be calculated as follows:

1. Calculate the amount of enriched product Utility B wants, as well as the quantity of SWUs and natural feed required at .2 tails.

100,000 SWU at .2 tails will produce 100,000/5.19 or 19,268 KgU as 3.4 percent enriched UF_6, and requires 19,268 × 6.26 or 120,618 KgU as natural UF_6 feed.

2. Calculate the quantity of SWUs and feed that would be required at .28 percent tails assay.

19,268 KgU at 3.4 percent enrichment with .28 tails requires 19,268 × 4.32 or 83,238 SWU and 19,268 × 7.24 = 139,500 KgU feed.

3. Calculate the cost of 19,268 KgU at 3.4 percent enrichment with .2 w/o TA.

100,000 SWU × $109.39 per SWU ($138.65-$29.26) + 120,618 KgU feed × feed price ($48 per KgU feed) = $16,728,664.00.

4. In order to calculate the SWU price (SP) at .28 TA that would be equivalent to a discount of $29.26 at .2 TA, set the cost of product at .2 TA equal to the cost of the *same amount* of product (19,268 KgU as UF_6) at .28 TA.
5. Thus, at .28 TA, the cost of 19,268 KgU as 3.4 percent enriched UF_6 would be calculated as

83,237 SWU × SP in $ per SWU + 139,500 KgU feed × feed price ($48 per KgU feed) = $16,728,664.00.

6. Thus, 83,238 × SP = $10,032,664, so SP = $120.53.

Solving for SP indicates that a price of $120.53 per SWU at .28 tails offered by Utility A will be effectively equivalent to a SWU price of $109.39 at .2 tails. So Utility A only would need to offer a discount of $138.65 – $120.53, or $18.12 per SWU to complete this transaction.

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CURRENT MARKET DATA

EXCHANGE VALUE $21.50/lb. U_3O_8
Determined as of January 31, 1983

Definition[1]

The Exchange Value is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the last day of the month.

Derivation

Nuexco bases the Exchange Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Exchange Value:

A. The price of uranium delivered or to be delivered under old contracts.
B. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.

[1] In December, 1981, Nuexco published a history of the Exchange Value which chronicled, month-by-month, changes in its definition, usage and derivation. Copies are available upon request.

TRANSACTION VALUE[2]
Determined as of January 31, 1983

$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
19.35	5.4	12	3

Definition

The Transaction Value is a weighted average price of recent transactions, and is based on prices paid for U_3O_8 in transactions closed within the previous three-month period and for which delivery was scheduled within one year of the transaction date. At least ten transactions totaling at least two million pounds U_3O_8 are included in each calculation, or the sample time is extended as necessary to include these minima. Foreign currencies are converted to US dollars as of the transaction date.

Comments

Nuexco does not consider the following in determining the Transaction Value:

A. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.
B. The price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of Exchange Value or any other independent variable. Also excluded from consideration are all data where the delivery price is defined in such a way that it cannot currently be determined.

[2] Transaction Values for 1976 through 1981 and their associated parameters (millions of pounds, number of transactions and number of months) are tabulated on pages 31 and 32 of Report 161. Corresponding data for 1982 are tabulated on page 5 of Report 173.

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CURRENT MARKET DATA

CONVERSION VALUE[1] $1.20/lb. U as UF_6
Determined as of January 31, 1983

Definition

The Conversion Value is Nuexco's judgment of the price at which spot and/or near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the last day of the month.

Derivation

Nuexco bases the Conversion Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Conversion Value:

A. The price of conversion services delivered or to be delivered under old contracts.
B. The price of conversion services delivered in connection with contract renegotiations or other than arm's length transactions.

[1] Monthly data for 1981 and 1982 are tabulated on page 6 of Report 173.

LOAN USE CHARGE RATE[2] 6%
Determined as of January 31, 1983

Definition

The Loan Use Charge Rate is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the last day of the month.

Derivation

Nuexco bases the Loan Use Charge Rate upon:

A. Data from recently completed or pending loan transactions.
B. Rates included in firm proposals to borrow or lend.
C. Rates that potential borrowers and lenders have expressed as a willingness to pay or accept, but for which Nuexco is not aware of firm proposals.

[2] Monthly data for 1968 through 1981 appear on pages 32-34 of Report 162. Monthly data for 1982 appear on page 2 of Report 173.

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CURRENT MARKET DATA

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates	per kg U_3O_8 in Concentrates	per kg U in Concentrates
Australia (dollar)	22.07	48.66	57.39
Belgium (comm. franc)	1,029	2,268	2,674
Canada (dollar)	26.56	58.56	69.06
Finland (markka)	116.03	255.80	301.65
France (franc)	148.07	326.44	384.95
FRG (Deutschmark)	52.26	115.21	135.87
Italy (lira)	30,197	66,572	78,504
Japan (yen)	5,078	11,195	13,202
Netherlands (guilder)	57.41	126.57	149.25
South Africa (rand)	22.92	50.53	59.59
Spain (peseta)	2,771	6,110	7,205
Sweden (krona)	159.73	352.15	415.27
Switzerland (franc)	42.76	94.27	111.17
UK (pound)	13.98	30.83	36.35
US (dollar)	21.50	47.40	55.90

TRANSACTION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates	per kg U_3O_8 in Concentrates	per kg U in Concentrates
Australia (dollar)	19.86	43.79	51.65
Belgium (comm. franc)	926.10	2,041	2,407
Canada (dollar)	23.90	52.70	62.15
Finland (markka)	104.43	230.22	271.49
France (franc)	133.26	293.80	346.46
FRG (Deutschmark)	47.03	103.69	122.28
Italy (lira)	27,177	59,915	70,654
Japan (yen)	4,570	10,075	11,882
Netherlands (guilder)	51.67	113.91	134.33
South Africa (rand)	20.63	45.48	53.63
Spain (peseta)	2,494	5,499	6,485
Sweden (krona)	143.76	316.94	373.74
Switzerland (franc)	38.48	84.84	100.05
UK (pound)	12.58	27.75	32.72
US (dollar)	19.35	42.66	50.31

[1] Calculated using currency exchange rates published in the Wall Street Journal on January 31, 1983.

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CONVERSION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U as UF_6	per kg U as UF_6
Australia (dollar)	1.23	2.72
Belgium (comm. franc)	57.42	126.58
Canada (dollar)	1.48	3.27
Finland (markka)	6.48	14.28
France (franc)	8.26	18.22
FRG (Deutschmark)	2.92	6.43
Italy (lira)	1,685	3,716
Japan (yen)	283	625
Netherlands (guilder)	3.20	7.06
South Africa (rand)	1.28	2.82
Spain (peseta)	155	341
Sweden (krona)	8.92	19.65
Switzerland (franc)	2.39	5.26
UK (pound)	0.78	1.72
US (dollar)	1.20	2.65

[1] Calculated using currency exchange rates published in the Wall Street Journal on January 31, 1983.

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CURRENT MARKET DATA

TRANSACTION SUMMARY[1]

Uranium Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current E.V.	Seller	Buyer	Remarks
2107	1983	301-600	90	European Entity	European Utility	UF_6
2121	1983	301-600	95	US Utility	US Producer	UF_6
2125	1983	601-1000	unknown	US Producer	Far East Utility	
2130	1983	Less than 50	98	US Producer	US Producer	
2132	FY88	301-600	indeterminate	US Utility	European Entity	enriched UF_6

Conversion Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U equivalent)	Approximate Price as Percent of Current C.V.	Seller	Buyer	Remarks

There are no conversion transactions reported this month

Loan Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current L.U.C.R.	Lender	Borrower	Remarks

There are no loan transactions reported this month.

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[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.

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URANIUM SUPPLY
(As of 1/31/83)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8)		Remarks
	Within 1 Year	Beyond 1 Year	
Available for Sale:			
ACTIVE			
1575		500 per year	Long Term
1610	25		
1818		300 per year	Long Term
1921	2,100		UF_6
2017		2,300	
2020		200 per year	1983-92
2038	2,000		UF_6
2056	2,200		UF_6
2116	700		
2126	500		UF_6
2158	700		
2203	1,200		
TOTAL:	9,425		
INACTIVE			
1581		100 per year	Long Term
1805		500 per year	Long Term
1877	125		
1928	1,000		UF_6
2196	500		
TOTAL:	1,625		

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[1] Measured from the date of this Report

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CURRENT MARKET DATA

URANIUM DEMAND
(As of 1/31/83)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Within 1 Year	Beyond 1 Year	Remarks
Inquiries to Purchase:			
ACTIVE			
1652		400 per year	Long Term
1871		250 per year	1983-86
1995	250		
1996		400	
2010		400 per year	1984-92
2030		1,000	1984-85
2042		400 per year	Long Term
2054	110		
2061	40		
2066		200	
2105	600		UF_6
2123	500	500 per year	1983-87
2167	250	250 per year	1984-99
2180	3,000		
TOTAL:	4,750		
INACTIVE			
1459		200 per year	Long Term
1843	250		
1888		400 per year	Long Term
1999		50 per year	1985-90
2025		350	
2032		200	
2108	2,200		
2114	200	200 per year	1984-90
2115	200	200	
2166	75		
TOTAL:	2,925		

[1] Measured from the date of this Report.

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CONVERSION SUPPLY
(As of 1/31/83)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U as UF₆) Within 1 Year	Beyond 1 Year	Remarks
ACTIVE			
1609	500	1,500 per year	Long Term
1840	130		
1936	1,000	200 per year	Long Term
2051	1,000		
2143		400	
2181	650	650 per year	Long Term
TOTAL:	3,280		
INACTIVE			
2008	800	800	
TOTAL:	800		

CONVERSION DEMAND
(As of 1/31/83)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U as UF₆) Within 1 Year	Beyond 1 Year	Remarks
ACTIVE			
1995	220		
2148		400 per year	1984-90
TOTAL:	220		
INACTIVE			
1622	400		
2129	500	500	
TOTAL:	900		

[1] Measured from the date of this Report.

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CURRENT MARKET DATA

LOAN SUPPLY AND DEMAND
(As of 1/31/83)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8)		Remarks
	Within 1 Year	Beyond 1 Year	
Available for Loan:			
ACTIVE			
1938	1,500		
2006A	600		
2121	600		
2204	500	200 per year	Long Term
TOTAL:	3,200		
INACTIVE			
1815	1,000		UF_6
1884	600		
1910	1,000		
1931	600		
2036	500		UF_6
2040	600		UF_6
2133	200		
2157	600		
2159	2,000		
TOTAL:	7,100		
Inquiries to Borrow:			
ACTIVE			
1998	200	200	
2006	600		
2070	200		UF_6
2125	700		UF_6
TOTAL:	1,700		
INACTIVE	None		

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[1] Measured from the date of this Report

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AFRICA

Introduction

African uranium production in 1982 declined from 1981 levels and promises to be even lower in 1983. While South Africa, Namibia, Niger and Gabon all have the ability to expand production, they are unlikely to do so until market conditions improve. Much of the production from these countries is committed under long-term contracts at prices which are well above current spot levels, and some customers have successfully negotiated reduced delivery quantities.

Central Africa

France remains the principal customer for output from **Niger** and **Gabon**. Niger's production during 1982 was 11.1 million pounds U_3O_8, essentially the same as in 1981. However, cutbacks of perhaps 20 percent are likely in 1983. Despite the completion of expanding processing facilities, Gabon's 1982 production of 2.5 million pounds U_3O_8 was approximately the same as 1981, with no significant increase expected in 1983. A decline is possible, especially if customers holding large inventories reduce or terminate deliveries.

Namibia

Rossing, the world's largest uranium facility, continued to operate near full capacity, producing approximately 10 million pounds U_3O_8. There are some indications, however, that contracted deliveries are somewhat less and that inventory is being accumulated. The situation could worsen substantially if Rossing's United Kingdom customer carries out its announced plans not to renew its contract after it expires in 1984.

Republic of South Africa

South Africa's nuclear power program suffered somewhat of a setback at the end of 1982, when, on December 18-19, both of the Electricity Supply Commission's (ESCOM) Koeberg units were damaged by a series of explosions. (The African National Congress, a dissident group outlawed in South Africa, claimed responsibility for the sabotage.)

Operation of Koeberg Unit 1, which had been ready for fuel loading, will be delayed an indefinite period, perhaps as much as nine months if replacement parts for the damaged control rod drive mechanisms are not readily available. A complicating factor is the uncertainty with regard to how many of the mechanisms need to be replaced. The attack also called into question the adequacy of security measures at the site. Even though those security measures have been regarded as among the most stringent in the world, debate over the issue could prolong the anticipated delay.

* * *

In a year end review of the uranium market, Messrs. G. Langton and D.A. Etheredge, senior officials of Anglo-American, commented as follows:

"The uranium market continued to weaken during the past year to the extent that commercial spot prices in real rand terms, measured against average South African mine working costs, have fallen to their lowest level ever, despite the depreciation of the rand against the US dollar. These very low prices do not reflect long-term contract prices, which remain significantly higher, though they have come under pressure in the past few years.

"The current high costs of production in relation to prices are making the position intolerable for an increasing number of producers around the world and this is reflected in the steps taken by the US authorities to limit the volume of imports of foreign uranium. If this attempt to protect US uranium producers from free market forces is successful, a two-tier market probably will develop, and undoubtedly will exacerbate the projected supply-demand imbalance in the rest of the world."

The comments of Messrs. Langton and Etheredge may lend some perspective to the recent spot and near-term market price increases. The balance of market forces may have altered for the short term, but producers face some serious fundamental problems in the long term.

* * *

Generally, South Africa's gold and uranium industry encountered difficult conditions throughout the year, with both lower gold prices and uranium spot prices. However, despite these adverse factors, all the uranium producers (other than West Rand Consolidated, a high-cost primary producer) were able to remain in production. This resilience was largely due to the following factors.

1. Production costs are relatively low in general, because so much of South Africa's uranium is produced as a by-product or a co-product of gold.
2. The richness of South Africa's gold deposits enables the gold producers to remain profitable, even if both uranium and gold market prices are low.

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3. A weak rand relative to the dollar, and the fact that a large number of uranium sales and all gold sales were priced in dollars, combined to mitigate much of the effects of declining spot market prices and depressed worldwide demand for uranium. As a result, revenue in rand terms will probably exceed that of 1981 slightly, in spite of lower production.

4. The multitude of uranium-bearing reefs enhances producers' ability to vary grades and throughput to meet prevailing economic circumstances. For example, the weak uranium spot market led South African producers to trim back production where possible to meet contract commitments only, and not to overproduce for the spot market or for inventory.

5. South Africa's reputation for reliable supply has been an important factor in developing loyalty and sound long-term relationships among its traditional customers.

Final 1982 uranium production figures from South African gold-uranium operations (members of the Chamber of Mines) were released this month and are presented in Table 1. It also presents the corresponding figures for each quarter of the year. Table 1 includes all of South Africa's uranium production except that of Palabora, which is not a member of the Chamber of Mines. That figure is scheduled to be released in a few months.

Table 1

**REPUBLIC OF SOUTH AFRICA:
1982 URANIUM PRODUCTION FROM GOLD-URANIUM OPERATIONS
(thousands of pounds U_3O_8)**

Operation	1Q82	2Q82	3Q82	4Q82	Total
Beisa (St. Helena)	104[1]	133	149	172	558
Blyvooruitzicht	164	153	127	113	557
Buffelsfontein	320	320	315	324	1,279
CHEMWES	336	280	376	346	1,338
Dreifontein Consolidated	129	125	129	112	495
ERGO	149	141	141	152	583
Harmony	316	326	329	332	1,303
Hartebeestfontein	239	229	226	251	945
J.M.S.	591	490	457	365	1,903
Randfontein	245	231	271	273	1,020
Vaal Reefs	756	983	1,062	994	3,795
Western Areas	58	100	105	112	375
Western Deep Levels	101	95	94	114	404
TOTAL:	3,508[2]	3,606	3,781	3,660	14,555

[1] Revised production figure for startup phase.

[2] Revised since Report 165 to take account of revised figure for Beisa production in startup phase.

Some specific observations about the figures in Table A and about 1982 uranium production from gold-uranium operations in South Africa:

1. Fourth quarter production of approximately 3.7 million pounds U_3O_8 was down three percent from the third quarter output of 3.8 million pounds, but it was essentially the same as the corresponding figure for the fourth quarter of 1981.

2. The total for the year was approximately 14.6 million pounds U_3O_8, down 6 percent from the 1981 level of 15.5 million pounds.

3. 1982 saw the commissioning of St. Helena's new plant (Beisa) and a progressive build-up of tonnage during the year. First quarter production, initially announced in Report 168 as 122,000 pounds U_3O_8, has been revised to 104,000 pounds (during the startup

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phase). Fourth quarter production of 172,000 pounds led to a total for the year of 558,000 pounds U_3O_8.

4. At Blyvooruitzicht, fourth quarter and annual production for 1982 declined 11 percent and 20 percent, respectively, due to a 19 percent drop in average grade of ore treated. Unless able to contract at prices above current market levels, Blyvooruitzicht will likely cease production by the end of 1984 and meet its remaining obligations by deliveries from inventory.

5. In 1982, production at Buffelsfontein dropped 8 percent from 1981 due to lower average grade and lower throughput.

6. 1982, production at Chemwes was down 9 percent due to lower grades treated. Due to the recalculation of tonnage contained in the Stilfontein and Buffelsfontein slimes dams, the Stilfontein shareholding in Chemwes has been reduced from 85 percent to 80 percent and the Buffelsfontein share has been increased from 15 percent to 20 percent.

7. At Dreifontein Consolidated, lower grade and throughput caused fourth quarter production to decline by 13 percent from the third quarter. The annual total for 1982 was 7 percent less than 1981 for the same reasons.

8. At ERGO, 1982 production was 12 percent lower than 1981 due to lower grade.

9. Harmony production remained constant at approximately 325,000 pounds U_3O_8 per quarter and 1.3 million pounds per year.

10. Hartebeestfontein production was down 10 percent in 1982, due mainly to lower throughput.

11. J.M.S. production was down 21 percent in 1982, due to 25 percent lower tonnage throughput and a revised feed sources scheme.

12. Randfontein production was 22 percent lower than 1981, due to lower tonnage treated (12 percent less) and lower grade (12 percent less). Those factors came about as a result of cessation of operations at the millsite plant and due to operating difficulties during the year with the Cooke section uranium plant. The plant is now running at design efficiency, and extensions to it are currently underway.

13. Vaal Reefs overcame operating problems at the south uranium plant during the year, in time to equal 1981 output. During the year, the new Afrikander lease uranium plant was completed and put on a standby basis due to the depressed uranium market.

14. Western Areas commissioned its new uranium plant and progressively built up production during the year, from 58,000 pounds U_3O_8 in the first quarter, to 112,000 pounds in the fourth quarter. Planned efficiencies are now being achieved.

15. Western Deep Levels' 1982 production was down 14 percent, due mainly to lower grade (down 12 percent).

During 1982, nine Chamber of Mines uranium producers experienced declines in output, with Anglo American's JMS having the largest single decline, 478,000 pounds (twenty percent). Furthermore, 1982 saw the cessation of production at West Rand Consolidated, which had produced approximately 420,000 pounds U_3O_8 in 1981. Against these declines, the year brought new production from St. Helena's Beisa section (558,000 pounds) and from Western Areas (375,000 pounds). The year also brought marginal production increases at Vaal Reefs and Harmony. The net effect was an overall decline in 1982 production of almost one million pounds, almost six percent below 1981.

AUSTRALIA

Two trends characterized the Australian uranium industry in 1982:

1. Producing mines and mills performed well. They exceeded production levels, met export schedules and reported profitable operations.

2. Companies whose uranium projects are still in the planning stage generally improved the status of their projects in terms of technical readiness, but made little progress in gaining market acceptance. Despite all the hard work, their goal of producing and delivering uranium is still six or seven years away, and this is as close as it has been ever since the discovery of the deposits.

Australia has the potential to become the largest uranium supplier in the world. To discover the potential in the form of uranium resources is one thing; to develop the fledgling industry to full adulthood is quite another. Although the past year brought some progress toward future growth, no actual growth in uranium production took place in Australia during 1982. In fact, the October closure of the Mary Kathleen Uranium (MKU) mill due to reserve exhaustion would have caused shrinkage had not the higher production of Nabarlek and Ranger compensated for the loss of one of Australia's oldest uranium mines.

Although uranium exports from these two operations had been delayed by union action in 1981, shipments continued without hindrance in 1982. The rational

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industrial relations practice of ERA, the owner of the Ranger Mine, helped much to set a cooperative climate for the Darwin dockyards. ERA (Energy Resources of Australia) reported a profit of A$37.9 million on uranium sales of A$146 million for the fiscal year ended June 30, 1982. For additional financial details, see Report 171. ERA's 1982 production was approximately 7 million pounds U_3O_8. The company is seeking additional markets, hoping to expand its share supported by substantial production capability. Its performance record, its management team, its easily expandable mine mill complex and its extensive reserves place the company in a most advantageous position as compared to its competitors.

The Nabarlek mill, owned by Queensland Mines Ltd., operated without disruption in 1982, producing approximately 2.8 million pounds U_3O_8. The company reported profitable results for the year, but published no figures. It needs to discover new reserves before it can offer post-1990 supplies to consumers. Exploration in the Arnhem Land leases is impeded by the need to obtain Aboriginal consent.

The partners of the Jabiluka Project (Pancontinental Mining Ltd. and Getty Development Corporation) were granted a 41-year mining lease over the Jabiluka uranium deposit by the Northern Territory government. The lease entitles the partners to proceed with mine and mill construction. Such a commitment, costing in excess of A$600 million, will require substantial support from consumers first. Despite strenuous sales efforts during 1982, no contracts were signed. The worldwide economic recession has not encouraged many utilities to enter into long-term sales contracts.

Western Mining Corporation's (WMC) Yeelirrie uranium project suffered a considerable setback during 1982, when Esso withdrew as partner from the project three months before the completion of the joint feasibility study. Although the study was completed on time, WMC was left with the task to find a new project partner and to dispose of the whole of the planned output. Yeelirrie production had been largely pledged to Esso under the joint venture agreement. So far, WMC has not found a successor to Esso. Even if it does, WMC is not likely to find a partner willing to accept the terms Esso accepted some years ago.

According to figures released by WMC, the Roxby Downs copper, gold and uranium deposit contains 32 million tonnes of copper, 2,832 million pounds of U_3O_8, and 1,200 tonnes of gold. Roxby Downs could contain twice as much uranium as all known Australian uranium deposits combined. Its relatively low grade will require large-scale underground operations to ensure its viability. As required by their indenture agreement with the state of South Australia, the joint venture partners, WMC and BP, will undertake a feasibility study to be completed by 1984. A decision on whether to proceed must be reached three years later.

Two other significant uranium deposits, Honeymoon and Beverly, are located in the state of South Australia. The newly-elected state government has thrown their development into uncertainty, at least for the time being. The Honeymoon partners, CSR and Teton, completed an in-situ leach pilot plant in November 1982. However, the project was put on a care and maintenance basis until the state uranium policy emerges. The non-Australian partner, Teton, is seeking to sell its project share and has stopped contributing financially to the project.

Negotiations between Denison and the Aboriginal traditional landowners over Koongarra have stalled. At year-end, Denison was concentrating on those mineral leases that do not require Aboriginal consent. In the interim, it is uncertain whether the differences between the parties will be resolved in time for the project to proceed in an orderly and economic manner. In addition to the environmental aboriginal and marketing problems, Denison must find Australian equity partners for 75 percent of the project.

The Mary Kathleen Uranium mill was finally closed in October 1982, having produced sufficient material to meet existing delivery obligations which extend to 1984. Production in 1982 was about 1,875,000 pounds U_3O_8. The mill was first closed in 1963, but was reopened in 1975 on the basis of contracts written in the late 1960s and early 1970s.

The small Lakeway project in Western Australia, owned by CSR and VAM Ltd., received development approval from State and Federal authorities. The partners have made some attempts to sell the future output, but so far without success. The deposit is 100 percent Australian-owned and the partners may offer a maximum of 25 percent equity participation to consumers. Its small size (one million pounds per year planned production) may have some attraction to a foreign utility in a depressed market.

The potential of the Westmoreland uranium deposit in Northern Queensland has been downgraded substantially following the failure to extend the known miner-

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alization. The partners involved in the project have held ambitious plans for extending the reserves previously outlined, but drilling during 1982 has failed to produce desired increases. The partners have previously disclosed reserves of 11,400 tonnes U_3O_8, but the geology of the deposit is such that a total of at least 15,000 tonnes would need to be developed before the project would be viable. The partners in the project are Queensland Mines Ltd. (40 percent), CSR (12.5 percent), IOL Ltd. (9.75 percent), and Urangesellschaft Australia Pty. Ltd. (37.5 percent).

The Australian enrichment group, UEGA, selected the Urenco-Centec technology for its impending feasibility study to establish a centrifuge enrichment plant in Australia in the 1990s.

During 1982, Australia concluded a bilateral safeguards agreement with Japan after four years of intensive negotiations. Safeguards talks with Egypt are continuing.

Uranium became once again a prominent item in Australian politics when the Australian Labor Party (ALP) modified its uranium policy in August 1982. The previous Labor Party policy required an incoming Labor government to end uranium mining and to repudiate existing sales contracts. The modified policy is less specific and would allow a Labor Government, if voted into office, more flexibility, but its very absence of clarity causes tension within the ALP. It was intended to contain sufficient hardline rhetoric to satisfy the Labor Party anti-nuclear faction, but also enough latitude to allow uranium mining and new developments, if politically expedient. The internal debate in the ALP has not stopped since the adoption of the new policy. However, if the Australian economy continues to decline, uranium may soon be replaced by the more necessary practical concern of rising unemployment.

The Liberal Government, despite many political setbacks, appeared at the end of the year firmly enough entrenched and sufficiently endowed with electoral favors to most likely win the next federal election, now scheduled for March 5, 1983. The Labor Party, in a surprise move, recently changed leaders from Mr. Hayden to Mr. Hawk. The new Labor leader has strong electoral appeal and the Liberal Party under Mr. Fraser will find in him a tough opponent with a very good chance of winning office.

The uranium policy under a Hawk-led Labor Party is not certain. However, based on general attitudes, it would not be surprising to find no new uranium mines allowed in Australia, except perhaps Roxby Downs. A uranium enrichment plant would likely find little acceptance with the Labor Party. If Labor won the election, its policies would likely be in effect for three years.

During 1983, Australian producers will face the challenge of renegotiating contract prices for current deliveries in the presence of a world economic climate which will set utilities against producer demands. Entering into new purchase commitments from mines in the planning stage will take, next year, more courage than ever from utilities, because even the utilities' own projections of demand growth must be uncertain.

EUROPE

Belgium's proportion of electricity generated by nuclear power in 1982 was 27.7 percent. During the course of the year, Doel 3 and Tihange 2, 900 MWe each, were connected to the grid. Belgium's installed nuclear capacity at the end of 1982 was 3,450 MWe, if one counts reactors actually operating in the country (i.e., 100 percent of Tihange 1 and 0 percent of Chooz) or 3,170 MWe if Belgium's actual share of the nuclear power plants is taken into consideration (i.e., 50 percent of Tihange 1 and 50 percent of Chooz in France).

It has been announced that the operation of Doel 3 and Tihange 2 will enable electricity prices to be lower in 1983 than they would have been with conventional power plants. A reduction of 0.13-0.20 Belgian francs per kilowatt hour is predicted.

Belgium is considering taking a 20 or 25 percent stake in the two 1300 MWe plants France wants to build at Chooz. Belgium would take 20 or 25 percent of the electricity produced. A decision on this is tied up with Belgium's future energy policy. It is thought that at least one 1300 MWe plant will be needed during 1991, but accepting France's offer would force Belgium into giving the order for the new plant (probably Doel 5) to Framatome. This cooperation with Framatome could help the Belgian nuclear sector to survive, but would take away Belgium's chance to diversify its suppliers to Westinghouse or Kraftwerk Union (KWU).

* * *

Installed nuclear capacity in **France** at the end of 1982 was 23,400 MWe. During the year, two reactors were connected to the grid, Blayais 2 (920 MWe) and Chinon B1 (900 MWe). Seven reactors are expected to start up in 1983: Blayais 3 and 4, Chinon B2, Cruas 1 and 2, and Paluel 1 and 2.

Chinon B4 (900 MWe), Nogent 2 (1300 MWe) and Cattenom 3 (1300 MWe) were the first three out of the six reactors for which the French government gave approval in 1981 for construction starts in 1982-83. These will come onstream in 1987 and 1988.

Preparations are underway for the ninth five-year plan for the years 1984-88. Estimates of economic growth and energy consumption in the 1990s are being revised substantially downwards. Also, rumors are circulating that as few as three construction starts for 1984-85 may be authorized instead of the six presently planned. The new plan will be published in the spring of 1983.

The average availability figures for French PWRs fell in 1982 to approximately 56 percent (down from 63 percent in 1981 and 69 percent in 1980). This drop was due to the larger than usual number of units (seven) which were shut down for the usual four-month checkup after 18 months on line, to turbine-generator problems, and to a spate of incidents including the replacement of all the control rod guide tubes on six stations. For this reason, the nuclear share of total electricity output in 1982 was 38.7 percent, approximately the same as 1981. It is expected that this figure will reach nearly 50 percent at the end of 1983 and 70 percent by the end of the decade.

Cogema's activities in the US market must be one of the major highlights for 1982. Acquisition of Pathfinder Mining Company was concluded at the beginning of 1982 and, in the summer, Cogema established a US subsidiary to service the American market, Cogema Inc. At the end of 1982 it was announced that Cogema Inc. had sold enriched uranium to a US utility which marks its first penetration in this market.

In France, Cogema acquired 17.33 percent of Imetal which controls significant uranium production in France and shares in Comuf, Somair and Amok abroad.

Other changes of significance in the structure of the uranium mining industry in France were:

1. The acquisition by Total (CFP) of PUK's 50 percent share of Minatome, giving it a 100 percent interest. Pechiney Ugine-Kuhlmann (PUK) is withdrawing from Minatome (50 percent PUK and 50 percent C.F.P.). Uranium Pechiney, subsidiary of PUK, will give over to C.F.P. its 50 percent share in Minatome. Pechiney will take back the projects which it held before the formation of Minatome in 1975. These were the 12.99 percent in COMUF (Gabon), 7.58 percent in Somair (Niger) and 25 percent in AMOK (Canada). C.F.P. (Total Group) is left essentially with Scumra in France, the Rossing shareholding and the partnership working teams of exploration.

2. The acquisition by Total of Dong Trieu from the Schneider Group. This makes Total the number two organization in the French uranium mining industry. Dong Trieu (DT) announced on December 31, 1982 that the Total Group had purchased control of Dong Trieu from Schneider S.A. In France, DT owns uranium reserves of 7,000 tonnes U which it is exploiting at the rate of 450 tonnes U per annum. DT is thus the second largest uranium producer in metropolitan France. It also holds interests abroad and is at present studying their potential.

Taking control of DT marks for Total a new step in the development of its uranium sector, where it already holds considerable interests in France and abroad. Those are held through Minatome which is now a wholly owned subsidiary of the Total Group.

The Total Group's acquisition of Dong Trieu and Minatome makes possible the formation of a French mining group of international stature. There are now only two significant uranium mining groups in France, Cogema and Total. The exploration interests of DT and Minatome will complement one another, and adding together Scumra and DT production in France will give Cogema a sizable competitor.

3. In the enrichment field, Eurodif's gaseous diffusion plant at Tricastin achieved full capacity of 10.8 million SWU at the end of 1982. Full capacity could have been achieved much earlier, but reduced demand and the desire to smooth out the possible economic problems of its subcontractors led the company to delay that date. It is predicted that Eurodif production will be geared to demand and a possible figure for 1983 production is 5-6 million SWU.

4. The decision for Framatome and Cogema to build a fuel fabrication plant at Pierrelatte was taken in 1982. It will have an initial capacity of 500 tonnes and is scheduled to be in production in 1984. Capacity at FBFC's plants at Romans in France and Dessel in Belgium totals 800 tonnes.

5. France began to reprocess fuel from its PWR program this year, although since 1976 it has reprocessed 500 tonnes of oxide fuel from LWRs in Europe and Japan. In March 1982, the French government finished its examination of Cogema's investment program at Cap La Hague. It gave its approval for the building of two

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new reprocessing plants by the late 1980s, one for the domestic market and one for foreign spent fuel.

* * *

In the **Netherlands**, the two commissions mentioned in our summary of events for 1981 were still at work throughout 1982. The first was initiated in response to the activities of the strong opposition groups to nuclear power in the 1970s and was intended to be a discussion by all sides on whether to build any more nuclear power plants. A report by the Brede Maatschappelijke Discussie was scheduled for publication at press time, and a final report is expected by the end of 1983. With the downturn of electricity consumption, some knowledgeable sources say that no decision on new nuclear plants will be needed for many years. Indications of official attitudes can be drawn from the 1982 decision to suspend, after 1986, the 90 percent government financing of Neratoom, the national nuclear research and investment consortium. The Netherlands has also virtually withdrawn from the Kalkar fast breeder reactor demonstration project on which it was collaborating with West Germany and Belgium.

The second commission, called the Beek Commission, was appointed to study the implications of closing the two nuclear plants which are operating in the Netherlands, Dodewaard (54 MWe) and Borssele (475 MWe). The commission is in the process of finalizing its studies. There is no expectation that the plants will be closed down. The fear of tremendous economic losses in the wake of the plants' closure acts as an important deterrent.

* * *

Portugal produced approximately 290,000 pounds U_3O_8 in 1982. The country's producing entity, ENU (Empresa Nacional de Uranio) continued prospecting in an area of the central region of Portugal called Azere, which is being drilled with promising results. ENU also maintained negotiations with some foreign companies to form joint venture associations for exploration in selected areas of Portugal where radioactive indications have already been found. These are expected to be concluded during 1983.

ENU proceeded with the feasibility study for the Nisa deposits in the southeastern part of Portugal. It is planned to start construction of the mill and treatment plant during 1984 with a view to production starting at the end of 1986 or the beginning of 1987. Annual production from Nisa is expected to exceed 500 thousand pounds U_3O_8.

* * *

In **Switzerland**, the Kaiseraugst nuclear station made its way through another step in the cumbersome Swiss approval process for nuclear power plants. The plant received the approval of the Staemderat (upper house) of the Swiss Parliament by a vote of 32-10. The lower house still has to vote on the issue, and this is not expected to happen until early 1984. If the lower house approves, construction can begin immediately. But it is not likely to do so since some of the contracts for the plant will no doubt have to be renegotiated. Thus, construction is expected to begin in late 1984.

Under the current Swiss law, a nuclear plant must go through several stages of approval. The general authorization is received from the Bundesrat (executive branch) having determined a need for power. Then both houses of Parliament must approve the plant. This is in addition to other safety regulations.

The deciding issue in the Staemderat vote appeared to be need for power. When the Kaiseraugst plant was first considered, it was based on an estimated electric load growth of 2.2 percent per year. In fact, the Swiss growth rate has been 2.7 percent, thus a shortage of power was foreseen by 1990 without new nuclear plants beyond Leibstadt, which is nearing completion. The Staemderat also passed an advisory vote (28-10) asking the Bundesrat to reconsider the requirement for cooling towers for the plant. The two cooling towers have been the source of most local opposition to the project. The government position on this issue is that it will be difficult to change to direct cooling without the concurrence of Germany and France, since the Rhine river also flows through those nations. The Graben nuclear plant will have to go through the same approval process as Kaiseraugst before it can begin construction.

A proposed new Swiss referendum on nuclear power represents another potential threat. If the supporters of the referendum are successful in collecting enough signatures to place it on the ballot, the Kaiseraugst decision could be reversed. The referendum, which is the supreme law in Switzerland, would provide that no new nuclear power stations be permitted after Leibstadt. Several years ago, a previous Swiss referendum against nuclear power was barely defeated by a vote of 51 percent to 49 percent, with about half of the eligible voters participating.

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At the end of 1982, installed nuclear capacity in the **United Kingdom** remained the same as in 1981, 6,700 MWe, accounting for approximately 12 percent of electricity output. None of the six long-delayed AGR units was commissioned in 1982, despite the fact that fuel has been loaded in three of them for some time. Commissioning problems have continued to affect these reactors which were ordered in the 1960s. Much of the work on these plants was completed almost ten years ago. All six units are expected to be connected to the grid in 1983—Dungeness B1 and B2, Hartlepool R1 and R2, and Heysham A1 and A2. Although their total rated capacity is 3,030 MWe, they will not be run at their design ratings, so they will add a total of approximately 2,760 MWe to the U.K. grid. Two pairs of AGRs—Heysham B1 and B2, and Torness Point 1 and 2—are, however, on schedule for startup in 1988.

No new reactors were ordered in 1982 and all attention is being focused on the public inquiry into the PWR system which started on January 11. The CEGB requires statutory consent to build a PWR at Sizewell B. It would be for 1,100 MWe with construction to start in 1984 and an onstream date of 1991.

In the submission for the inquiry, CEGB has postulated three scenarios for the 1990s which would require new nuclear capacity of the following magnitudes:

1. The high case would need 12,000 MWe;
2. The medium case would require 9,000 MWe;
3. The low case postulated no new nuclear power.

If approval for Sizewell B is given, it is expected that the subsequent nuclear stations will be PWRs. However, a recent newspaper article has cited a government source as stating that no more than four or five subsequent stations will be ordered, instead of the government's plans of three years ago to order one nuclear station a year in the decade from 1982. It can certainly be argued that electricity demand is expected to remain static for a few years and grow only slowly in the 1990s, but obsolete plants must be replaced and at least 3,000 to 4,000 MWe of Magnox capacity must be retired in the 1990s.

Urenco's enrichment capacity at the end of 1982 was 1,000,000 SWU per year, split between Capenhurst in England and Almelo in the Netherlands. Plants in both countries are suitable for expansion as demand arises.

Urenco reportedly obtained new enrichment orders during the year. The news in October that Urenco has been chosen by the Uranium Enrichment Group of Australia as a future partner for its proposed enrichment plant has provided a strong boost for the company, although it is recognized that it may well be in the late 1980s before construction starts.

* * *

The most significant events in 1982 in **West Germany** (FRG) were:

1. The resumption of licensing in the form of first part-construction permits for the Konvoy units Isar 2, Emsland (Lingen), Neckar 2 (GKN), and Biblis C.
2. The starting of the Grafenrheinfeld nuclear reactor.
3. The granting of the final construction permit for Brokdorf.
4. The start of construction on the gas centrifuge plant in Germany at Gronau on the Dutch border. It had been delayed for four years for political and administrative reasons. The first step of capacity will be for 400,000 SWU to come into service in 1986; it can be expanded to 1,000,000 SWU per year as demand indicates.
5. Perhaps most important, the parliamentary change in government on October 1 when the pivotal third party, the Free Democrats (FDP), switched from a coalition with the Social Democrats (SDP) to one with the more conservative Christian Democrats (CDU). The business community has viewed the change very positively. In addition, the Christian Democrats are pro-nuclear, and an extended period of CDU rule in Germany should bode well for nuclear power. A federal election has been called for March 6, 1983. If the Christian Democrats can remain in power after that election, economic recovery in Germany and the recovery of the German nuclear industry are generally hoped for.

One dark cloud on the horizon is in the form of a fourth political party in Germany, the notorious Greens. The Greens started out as an anti-nuclear power movement and have developed into an anti-technology, pro-disarmament party whose members are generally less than 30 years of age. Thus far, the Greens have not had any members in the federal parliament since, under German law, a party must draw at least five percent of the vote in order to have representation, and the Greens have not done so yet. However, recent public opinion polls have given the Greens as much as 6.5 percent of the electorate. (The Greens are already represented in six of the eleven state governments.)

At the same time, the shift in allegiance of the Free Democrats has been thought to cost that party support, and its share may slip to less than five percent. That has led to fears that the Greens may replace the Free

Democrats as the pivotal third party in Germany. If this happens, and if neither the Social Democrats nor the Christian Democrats pull an absolute majority in the March election, a coalition including the Greens will amost certainly result in further stagnation of nuclear power in particular, and perhaps the economy in general.

However, many observers are optimistic that the Christian Democrats will be returned to power in March, and the progress made in restoring the nuclear option in Germany will continue. The results of a recent FRG public opinion poll on the issue, conducted by the Emnid Institute and published on February 3, bolstered that optimism. The poll concluded that, had the upcoming federal election been held that day, the Christian Democrats would have received 49 percent of the vote, the Social Democrats 41 percent, the FDP *only 4 percent*, and the Greens 5 percent. Although the Greens' share of the opinion poll dropped from a previous high of 6.4 percent, a 5 percent share would still be enough to win a share of the seats in the Bundestag. The seats would then be distributed among the Christian Democrats, the Social Democrats and the Greens, in proportion to their relative shares, effectively ignoring the FDP's 4 percent. Thus, the Christian Democrats' 49 percent of the total would translate into an absolute majority of the Bundestag seats. They would then be able to form a government without the need to include the Greens as part of a coalition.

The poll has two overall implications that are favorable for nuclear power:

1. Support for the Christian Democrats is increasing.
2. Support for the Greens is decreasing. This would be especially favorable for the future of nuclear power in Germany if the Greens' support dropped below 5 percent.

FAR EAST

Japan's nuclear generation of electricity has increased steadily in recent years, such that nuclear power now is an important contribution to Japan's energy balance. In fact, it has recently surpassed hydroelectric output.

Reduced Growth Forecast

The Japanese Cabinet decided in April 1982 to lower its official target for installed nuclear power generating capacity to 46,000 MWe by 1990. The plan calls for nuclear power to constitute 22 percent of total capacity by 1990, and to furnish 30 percent of the total electricity generation. The previous target, established in 1981, had been more than 10 percent higher. Given current siting and licensing constraints, the new target seems optimistic. For example, TEPCO may soon delay by 6-12 months the commercial operating dates for Kashiwazaki Unit 1 (now scheduled for 1985) and Fukushima Units 3 and 4 (1985 and 1986).

The Japan Energy Economy Research Institute (JEERI) has published a long range forecast of power supply containing a nuclear power forecast which has a higher probability of success than do the official government targets. For example, JEERI forecasts that installed nuclear capacity in 1990 will be 38,000 MWe, constituting about 18 percent of energy supply. This compares to the official target of 46,000 MWe and 22 percent. Those figures correspond closely to Nuexco projections of 44 or 45 units and 36,000 to 37,000 MWe in service by 1991. Under such a scenario, Japanese utilities would only need to complete those units already under construction or authorized by the EPRDC, *plus 4 to 6 more*. A scenario in which 41 units comprising approximately 33,000 MWe are in operation by 1991 should be regarded as quite conservative. It is in the range between those 41 reasonably assured units and the target's 54 units that the uncertainty lies. In any case, Japan's annual rate of uranium consumption should remain below ten million pounds U_3O_8.

While official forecasts for nuclear power growth in Japan were reduced in 1982, there were numerous positive developments as well:

1. After a 6-month suspension, Japan Atomic Power Co.'s (JAPC) Tsuruga Unit 1 returned to commercial service on January 22. The suspension had resulted from a March 1981 spillage of radioactive waste which had been concealed from the authorities until April.
2. Chubu Electric Co. placed the order for its Hamaoka Unit 3, scheduled to begin service by 1986.
3. Shikoku's Ikata Unit 3 was scheduled for 1988 operation.
4. On January 26, the Ministry of International Trade and Industry (MITI) issued a construction permit to JAPC for its Tsuruga Unit 2, a 1,160 MWe PWR, scheduled to begin operations in 1987.
5. Hokkaido's Kyowa-Tomari Units 1 and 2 received official authorization from the EPRDC (Electric Power Resources Development Council). Construction is scheduled to start by late 1983, in order to begin operating by late 1988 for Unit 1 and early 1990 for Unit 2.

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6. TEPCO's (Tokyo Electric Power Company's) Fukushima II-1 entered commercial operations on April 20.
7. Shikoku's Ikata Unit 2 (566 MWe PWR) was placed in service.
8. Kyushu's Genkai Unit 2 was placed in service.
9. In September, the EPRDC formally approved the construction of Kyushu Electric Power Company's Genkai Units 3 and 4, two 1,180 MWe PWRs. Construction is scheduled to begin in 1984, for commercial operations in 1990 and 1991.

As of the end of 1982, Japan had 24 commercial nuclear power plants in operation, with an aggregate capacity of approximately 17,000 MWe, accounting for 12.5 percent of Japan's total power generating capacity. There are approximately 10,000 MWe under construction and preparations are being made for the construction of another 10,000 MWe. Of that amount, approximately half has been approved by the EPRDC.

During their 1982 fiscal year, the average availability factor of Japan's 24 operating reactors exceeded 70 percent for the first time. The unusually high figure for Japan is attributable to:

1. Shortening of the downtime for required periodic inspections.
2. More rapid startup procedures through the use of improved fuel designs.
3. Improved preventive maintenance techniques.

* * *

Uranium marketing activity continued at a reduced level. Large uranium inventories, large long-term forward commitments and the sustained weakness of market prices led Japanese buyers to feel much more comfortable about their long-term security of uranium supply. Sales efforts of uranium producers met with little success, if any, and Japan's long-term suppliers encountered a substantially tougher attitude toward annual price negotiations.

Japanese utilities completed negotiations with two of their major suppliers with respect to 1983 delivery prices. The agreed upon prices, $35.40 and $35.45 per pound U_3O_8, were lower than the $37.00-$38.50 range negotiated in 1981 for 1982 deliveries. Furthermore, they were substantially below the $45.00 prices negotiated in 1980 for 1981 deliveries. This price erosion can be expected to continue during 1983 negotiations for 1984 delivery prices. It would not be surprising to see price reductions of $5 to $10 come out of the current round of negotiations.

* * *

An important aspect of **Japan**'s nuclear development during 1982 was the intensified effort to develop its own fuel cycle. Rather than depending so much on the purchase of fuel cycle services from other countries, Japan has undertaken a national effort to develop its own capabilities in reprocessing, waste storage and disposal, conversion and enrichment. For example, PNC (Power Reactor and Nuclear Fuel Development Corporation) is operating a pilot enrichment plant. PNC is also carrying out batch operations at its pilot plant for UF_6 production. The plant is unusual in that the technology, developed by PNC, allows the production of UF_6 directly from uranium ore without passing through the U_3O_8 stage. Eventually, the development of indigenous capabilities in those areas will enable Japan to increase its security and diversity of supply throughout the fuel cycle.

* * *

The **People's Republic of China** (PRC) became a more prominent participant in the world market during 1982. Plans for the Canton-Hong Kong (Guangdong) nuclear power project firmed and the PRC government officially approved the project. To be sited approximately 40 miles north of Hong Kong, it could be in operation by the early 1990s. Offering one of the few opportunities for near-term reactor orders, the PRC is being actively pursued by US and French vendors. US vendors are handicapped by the lack of a bilateral safeguards agreement between the US and the PRC, which has signed a protocol of an agreement for cooperation in the nuclear field. Although the protocol does not cover power reactor sales, it does appear to increase Framatome's chances of winning the reactor order.

The PRC also participated in a limited way in the uranium market. During July, the PRC delivered approximately 65,000 pounds U_3O_8 to Japan's Power Reactor and Nuclear Fuel Development Corporation (PNC). Although China had exported U_3O_8 to other Communist countries before, this delivery was the first PRC export to a non-Communist customer.

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Table 2
TAIWAN NUCLEAR POWER PROGRAM:

Unit	Type	MWe	Status at 12/31/82
Chin-shan 1	BWR	604	Operational since 12/78
Chin-shan 2	BWR	604	Operational since 9/79
Kuosheng 1	BWR	951	Operational since 12/81
Kuosheng 2	BWR	951	Loaded fuel 3/82 Generated first electricity 6/82 Reached full power 10/82 Power range testing underway
Total:		3,110	
Maanshan 1	PWR	907	Operation scheduled 4/84
Maanshan 2	PWR	907	Operation scheduled 4/85

Taiwan's nuclear power program continued approximately on schedule during 1982. Kuosheng Unit 2 progressed relatively smoothly through the final stages of construction and testing, ending the year on the verge of commercial operations.

Taiwan's national energy plan as of early 1982 had called for the construction of six more nuclear units, representing 6600 MWe, by the year 2000. Although generally depressed economic conditions and lowered forecasts of electricity demand led to the government's decision to defer planned Units 7 and 8, Taiwan's long-term energy future is still heavily committed to nuclear power.

Taiwan lacks indigenous sources of uranium and political circumstances dictate that uranium may only be purchased from South Africa and the US. That, and the fact that a substantial portion of the financing for Taipower's nuclear program has come from the Export-Import Bank, have enabled the US to maintain a preferred supplier position, both with respect to reactors and to uranium. During 1982, non-US reactor suppliers, particularly Framatome, vigorously challenged the US position.

Taipower ended 1982 with three nuclear power plants in operation, two under construction and Kuosheng Unit 2 generating electricity before entering commercial operations. The program is summarized in Table 2.

UNITED STATES

Both the US and the non-US uranium markets operated in 1982 under the threat of a renewed US restriction on uranium imports. More than a year after the first hearing on the viability of the US uranium industry, President Reagan signed into law Public Law 97-415 on January 4, 1983. The final language of the NRC Authorization Act, emerging after many twists and changes, can be viewed as a watered-down victory for the pro-import quota forces.

While the law does not contain the original call for a moratorium on foreign uranium contracting when imports reached 37.5 percent of US demand, the rhetoric of the Act does allow for the eventual implementation of such a restriction.

The Act calls for a comprehensive review of the US mining and milling industry to be submitted within 12 months of the Act's passage. Specific areas are outlined for review, including not only estimates of future uranium requirements, inventories and production levels, but also price levels under various scenarios.

The Act additionally calls for monitoring by the Secretary of Energy of the viability of the domestic mining and milling industry. The Secretary's determination is to be presented in annual reports to Congress and the President during the period 1983 to 1992. The

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criteria for the reports are to be established by September of this year, and topics to be covered are outlined. The report will include answers to the questions: "Can domestic reserves supply all future needs for a future 10-year period?" and what is the "level of domestic nuclear power needs for a 10-year period?" Such questions will provide many opportunities for interpretation.

The Secretary of Energy, based on the annual reports, can trigger two additional courses of action, if he determined that the level of imports represents a "substantial cause of serious injury, or threat thereof" to the US mining and milling industry—an investigation by the US International Trade Commission would be triggered. The secretary can also request investigations by the Secretary of Energy to "determine the effects on the national security of imports of source material" based on the 37.5 percent import level.

While the US has still not enacted any renewed uranium import restrictions, the new law established a mechanism which will make it necessary to readdress the issue in the future. The pro-import restriction forces can be expected to begin lobbying to formulate the criteria for the various reports and studies so as to speed up the process. The terms "viability" and "national security interests" are ambiguous enough to allow a wide range of interpretations. Thus, Public Law 97-415 maintains a Congressional focus on the domestic uranium industry, a partial victory for those in favor of uranium import restrictions.

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HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	**21.50**											

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	**19.35**											

HISTORICAL CONVERSION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	**1.20**											

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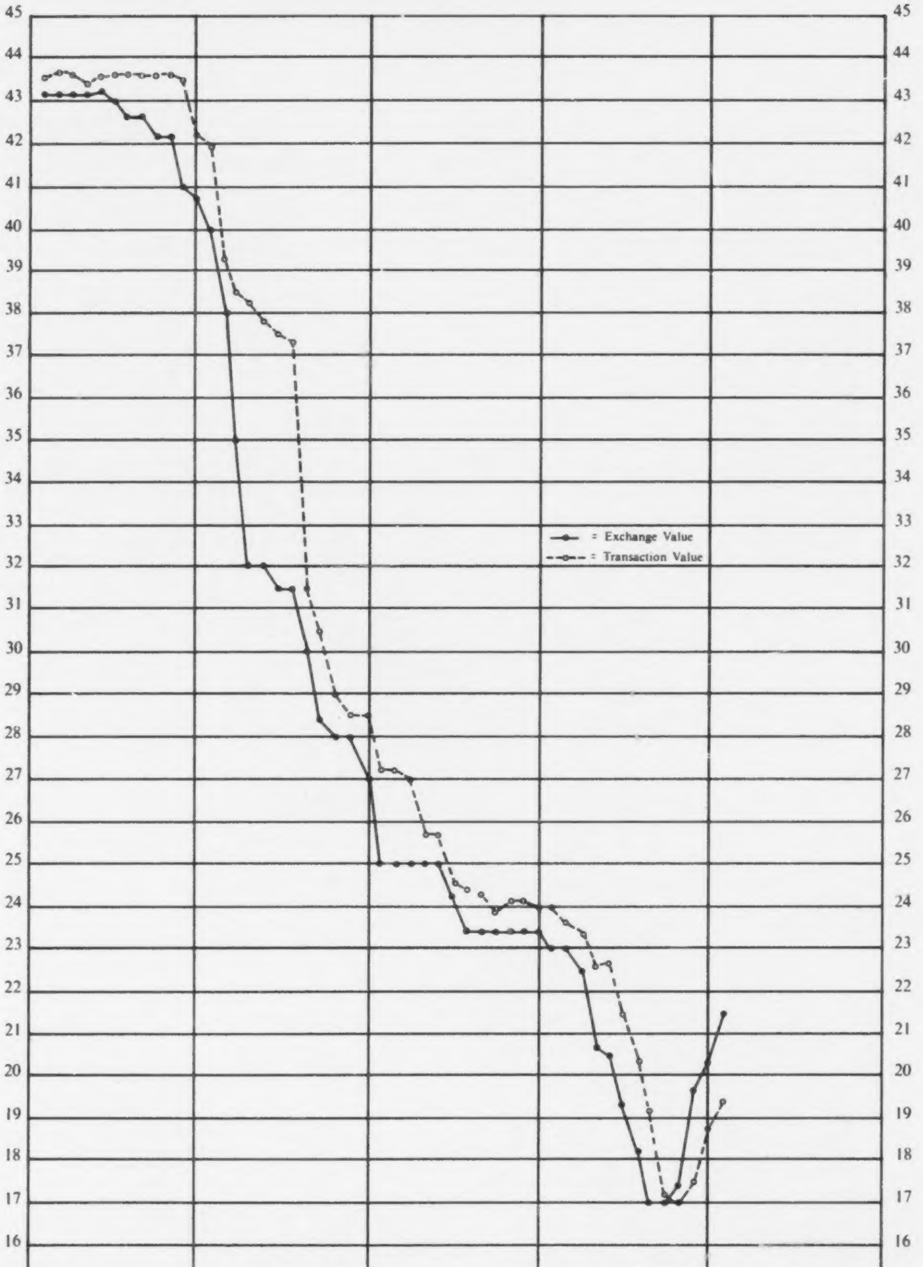
HISTORICAL MARKET DATA

EXCHANGE AND TRANSACTION VALUES SINCE JANUARY 1979

Determined as of the last day of the month indicated



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AUSTRALIA

	Price Index of Materials Used in Manufacturing Industry—All Groups (Year 1968-69 = 100.0)[1]	Weighted Average Rate of Pay Indexes Australia—Adult Males Wage Earners, Weekly Rates (Year 1976 = 100.0)[2]
Annual Avg. 1971[3]	101.5	65.95
Annual Avg. 1972[3]	105.6	71.26
Annual Avg. 1973[3]	124.4	78.96
Annual Avg. 1974[3]	141.9	108.07
Annual Avg. 1975[3]	150.4	132.55
Annual Avg. 1976[3]	168.4	160.93
Annual Avg. 1977[3]	192.0	179.03
Annual Avg. 1978[3]	198.5	190.04
Annual Avg. 1979	248.8	196.34
Annual Avg. 1980	321.8	218.00
Annual Avg. 1981	355.3	237.34
Aug 1981	360.9	154.1 R[2]
Sep 1981	358.4	155.0 R[2]
Oct 1981	352.5	155.6 R[2]
Nov 1981	351.3	157.5 R[2]
Dec 1981	349.9	167.4 R[2]
Jan 1982	354.9	169.0 R[2]
Feb 1982	356.7	170.4 R[2]
Mar 1982	360.3	170.7 R[2]
Apr 1982	367.7	170.7 R[2]
May 1982	367.6	171.2 R[2]
Jun 1982	367.2	172.4 R[2]
Jul 1982	369.1	176.3 R[2]
Aug 1982	371.5	176.8 R[2]
Sep 1982	374.0P	177.0 R[2]
Oct 1982	377.2P	177.1 P[2]

P = Preliminary   R = Revised since last month

[1] Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0), Table 3.

[2] Australian Bureau of Statistics, Canberra: "Wage Rates, Australia" (Catalogue No. 6312.0), Table 1. Figures are being converted to an Index number. As the data are converted, the new index numbers will be inserted.

[3] Monthly data for 1970 through 1978 appear on pages 4.7 and 4.8 of Nuexco Report 138.

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GOVERNMENT STATISTICS

CANADA

	Industry Selling Price Index: Manufacturing (D 500000)[1] [2] (1971 = 100.0)	Wage-earner Data: Average Hourly Earnings (C$)[3] [4]		
		Metal Mining, including Milling (SIC 050-059)	**Primary Metal Industries, non-ferrous (SIC 296-298)**	**Chemicals and Chemical Products (SIC 370-379)**
Annual Avg. 1978	190.4	8.76	6.82	6.97
Annual Avg. 1979	217.9	9.60	7.35	7.67
Annual Avg. 1980	247.2	10.59	8.05	8.50
Annual Avg. 1981	288.4R	12.02	9.03	9.53
Nov 1981	278.8	12.89	9.45	9.89
Dec 1981	280.0	12.87	9.42	10.03
Jan 1982	281.9	13.14	9.53	10.11
Feb 1982	283.5	13.25	9.60	10.19
Mar 1982	284.8	13.34	9.62	10.35
Apr 1982	287.7	13.46	9.79	10.48
May 1982	288.8	13.56	9.88	10.62
Jun 1982	289.7	13.71	9.92	10.69
Jul 1982	290.3	13.71	10.05	10.73
Aug 1982	290.1R	13.80R	10.03R	10.80R
Sep 1982	292.3	14.19R	10.18P	10.71P
Oct 1982	292.0R	13.84P	10.17P	10.78P
Nov 1982	291.0	—	—	—
Dec 1982	292.3	—	—	—

P = Preliminary R = Revised since last month

[1] Statistics Canada, Prices Division, Ottawa; "Industry Price Indexes" (Catalogue 62-011), Table 1. Indexes for the most recent six months shown are subject to revision.

[2] Monthly data for 1973 through 1978 appear on page 4.10 of Nuexco Report 138.

[3] Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa; "Employment, Earnings and Hours" (Catalogue 72-002), Table 2.

[4] Monthly data for 1977 and 1978 appear on page 4.11 of Nuexco Report 138.

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REPUBLIC OF SOUTH AFRICA

	Average Declared Working Costs per Metric Ton of Gold Ore Milled (Rand)[1]	Consumer Price Index[2] (1975 = 100, except where otherwise indicated)	Producer[5] Price Index All Groups (1975 = 100)	Total Employment in Mining and Quarrying (Code 35)[7]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand) (Code 40)[7]
Annual Avg. 1971[3]	7.88	106.4[4]	59.1	652,294	415,956
Annual Avg. 1972[3]	8.79	113.3[4]	63.9	623,067	443,933
Annual Avg. 1973[3]	10.51	124.1[4]	72.3	684,743	572,133
Annual Avg. 1974[3]	13.18	138.5[4]	85.3	674,140	761,596
Annual Avg. 1975[3]	16.71	157.2[4]	100.0	639,473	1,003,617
Annual Avg. 1976[3]	19.30	174.7[4]	115.1	671,240	1,212,983
Annual Avg. 1977[3] [6]	23.87	194.4[4]	130.0	712,006	1,420,670
Annual Avg. 1978[3] [6]	27.14	137.2	142.7	664,571	1,537,169
Annual Avg. 1979[3] [6]	30.18	155.3	164.5	692,209	1,830,632
Annual Avg. 1980[6]	35.53	176.7	192.1	714,379	2,279,615
Annual Avg. 1981	41.89	206.5	218.3	728,506	2,820,505
Jul 1981	—	204.6	218.4	735,839	249,080
Aug 1981	—	208.0	222.6	722,684	245,817
Sep 1981	43.28	211.6	224.6	724,604	251,502
Oct 1981	—	213.4	227.0	717,918	248,159
Nov 1981	—	214.8	229.4	720,255	253,044
Dec 1981	44.52	216.3	230.4	709,612	257,655
Jan 1982	—	217.6	233.1	700,375	257,173
Feb 1982	—	220.2	236.8	705,992	250,191
Mar 1982	45.49	225.2	237.4	725,700	262,210
Apr 1982	—	228.9	241.9	707,502	252,562
May 1982	—	230.3	244.8	715,162	258,770
Jun 1982	45.77	232.1	246.7	707,552	261,361
Jul 1982	—	234.1	249.4	702,141	283,248
Aug 1982	—	236.8	253.4	705,562	276,730
Sep 1982	48.04	241.0	255.0	704,490	281,331
Oct 1982	—	243.9	260.1	—	—
Nov 1982	—	245.4	262.5	—	—
Dec 1982	49.62	246.2	—	—	—

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[1] Chamber of Mines of South Africa, Johannesburg; "Analysis of Working Results," published quarterly.

[2] Republic of South Africa Department of Statistics, Pretoria; "Government Gazette: Consumer Price Index for Urban Areas."

[3] Historical data for the Average Declared Working Costs and Consumer Price Index 1970-1979 appear on page 4.9 of Nuexco Report 140.

[4] April 1970 = 100.00.

[5] Previously known as the WHOLESALE PRICE INDEX, now the PRODUCER PRICE INDEX. The computation remains the same.

[6] Historical data for Codes 35 and 40 1977-1980 appear on page 28 of Nuexco Report 157.

[7] Bulletin of Statistics, Department of Statistics, Pretoria.

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GOVERNMENT STATISTICS

UNITED STATES

	Producer Price Index—Industrial Commodities (1967 = 100)[1]	Producer Price Index—All Commodities (1967 = 100)[1]	Consumer Price Index (1967 = 100)[2]	GNP Implicit Price Deflator (1972 = 100)[3]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[4]			
					Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
Annual Avg. 1972[5]	117.9	119.1	125.3	100.00	4.56	4.59	4.26	3.71
Annual Avg. 1973[5]	125.9	134.7	133.1	105.75	4.84	4.98	4.51	3.91
Annual Avg. 1974[5]	153.8	160.1	147.7	115.08	5.44	5.63	4.88	4.21
Annual Avg. 1975[5]	171.5	174.9	161.2	125.79	6.13	6.24	5.39	4.64
Annual Avg. 1976[5]	182.4	183.0	170.5	132.34	6.76	6.87	5.91	4.96
Annual Avg. 1977[5]	195.1	194.2	181.5	140.05	7.28	7.67	6.43	5.39
Annual Avg. 1978[5]	209.4	209.3	195.4	150.42	8.23	8.56	7.02	5.82
Annual Avg. 1979[5]	236.5	235.6	217.4	163.42	9.27	9.50	7.60	6.32
Annual Avg. 1980[5]	274.8	268.8	246.8	178.64	10.26	10.63	8.30	6.94
Annual Avg. 1981	304.1	293.4	272.4	195.51	11.55	11.98	9.12	7.62
Annual Avg. 1982	312.3P	299.3P	289.1	207.23P	—	—	9.98P	8.17P
Dec 1981	310.0	295.8	281.5	201.55	12.08	12.45	9.53	7.90
Jan 1982	311.7	298.2	282.5	—	12.19	12.66	9.68	7.98
Feb 1982	311.4	298.5	283.4	—	12.22	12.61	9.68	7.96
Mar 1982	311.0	298.0	283.1	203.68	12.29	12.69	9.71	8.01
Apr 1982	309.9	298.0	284.3	—	12.23	12.68	9.81	8.03
May 1982	309.6	298.6	287.1	—	12.25	12.71	9.83	8.05
Jun 1982	310.6	299.3	290.6	205.98	12.26	12.91	9.95	8.09
Jul 1982	312.8	300.4	292.2	—	12.23	12.91	10.02	8.18
Aug 1982	313.2R	300.2R	292.8	—	12.29	12.97	10.03	8.24
Sep 1982	312.9P	299.5P	293.3	208.51	12.53	13.46	10.20	8.31
Oct 1982	314.4P	299.9P	294.1	—	12.50R	13.22R	10.24	8.34
Nov 1982	315.1P	300.4P	293.6	—	12.57P	13.32P	10.26R	8.38R
Dec 1982	315.0P	300.6P	292.4	210.73P	12.71P	—	10.36P	8.46P

P = Preliminary   R = Revised since last month

[1] US Bureau of Labor Statistics, Washington, D.C.; "Producer Prices and Price Indexes," Table 6 (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents.

[2] US Bureau of Labor Statistics, Washington, D.C.; Consumer Price Index for All Urban Consumers, US City Average, All Items.

[3] US Department of Commerce, Washington, D.C.; Bureau of Economic Analysis, National Income and Wealth Division; "Survey of Current Business," Table A. The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted.

[4] US Bureau of Labor Statistics, Washington, D.C.; "Employment and Earnings," Table C-2. All data based on 1972 revision of SIC Manual. Data for 1970-1976 are adjusted to the March 1977 benchmark. Data for 1977-1978 are adjusted to the March 1979 benchmark. Data for January 1979 and beyond are adjusted to the March 1980 benchmark.

[5] Monthly data 1970-1978 for Producer Price Index-Industrial Commodities, Consumer Price Index, and Employment and Earnings SIC codes 10, 333, and 28, and quarterly data for GNP Implicit Price Deflator appear on pages 4.6-4.8 of Nuexco Report 139.
Monthly data 1977-1978 for Employment and Earnings SIC Codes 10, 333, and 28 appear on page 33 of Nuexco Report 147.
Monthly data 1970-1978 for Employment and Earnings SIC Code 36 appear on page 23 of Nuexco Report 154.
Monthly data 1979-1980 for Employment and Earnings, Revised Establishment Data, all listed codes, appear on page 22 of Nuexco Report 158.
Monthly data 1977-1980 for Producer Price Index-All Commodities, appear on page 21 of Nuexco Report 158.

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Table 3A

COST OF ENRICHED URANIUM (US $ per KgU as UF_6, 3 percent U_{235}) FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS (0.20% TA)

Feed Cost (US $ per KgU as Natural UF_6)	SWU Price (US $ per SWU)								
	90	95	100	105	110	115	120	125	130
40	606.75	628.29	649.82	671.35	692.88	714.42	735.95	757.48	779.01
45	634.15	655.68	677.22	698.75	720.28	741.81	763.35	784.88	806.41
50	661.55	683.08	704.61	726.15	747.68	769.21	790.74	812.28	833.81
55	688.95	710.48	732.01	753.54	775.08	796.61	818.14	839.67	861.20
60	716.34	737.88	759.41	780.94	802.47	824.01	845.54	867.07	888.60
65	743.74	765.27	786.81	808.34	829.87	851.40	872.93	894.47	916.00
70	771.14	792.67	814.20	835.73	857.27	878.80	900.33	921.86	943.40
75	798.53	820.07	841.60	863.13	884.66	906.20	927.73	949.26	970.79
80	825.93	847.46	869.00	890.53	912.06	933.59	955.13	976.66	998.19
85	853.33	874.86	896.39	917.93	939.46	960.99	982.52	1,004.06	1,025.59
90	880.73	902.26	923.79	945.32	966.86	988.39	1,009.92	1,031.45	1,052.99
95	908.12	929.66	951.19	972.72	994.25	1,015.79	1,037.32	1,058.85	1,080.38
100	935.52	957.05	978.59	1,000.12	1,021.65	1,043.18	1,064.72	1,086.25	1,107.78
	90	95	100	105	110	115	120	125	130
105	962.92	984.45	1,005.98	1,027.52	1,049.05	1,070.58	1,092.11	1,113.65	1,135.18
110	990.32	1,011.85	1,033.38	1,054.91	1,076.45	1,097.98	1,119.51	1,141.04	1,162.57
115	1,017.71	1,039.25	1,060.78	1,082.31	1,103.84	1,125.37	1,146.91	1,168.44	1,189.97
120	1,045.11	1,066.64	1,088.18	1,109.71	1,131.24	1,152.77	1,174.30	1,195.84	1,217.37
125	1,072.51	1,094.04	1,115.57	1,137.10	1,158.64	1,180.17	1,201.70	1,223.23	1,244.77
130	1,099.90	1,121.44	1,142.97	1,164.50	1,186.03	1,207.57	1,229.10	1,250.63	1,272.16
135	1,127.30	1,148.83	1,170.37	1,191.90	1,213.43	1,234.96	1,256.50	1,278.03	1,299.56
140	1,154.70	1,176.23	1,197.76	1,219.30	1,240.83	1,262.36	1,283.89	1,305.43	1,326.96
145	1,182.10	1,203.63	1,225.16	1,246.69	1,268.23	1,289.76	1,311.29	1,332.82	1,354.36
150	1,209.49	1,231.03	1,252.56	1,274.09	1,295.62	1,317.16	1,338.69	1,360.22	1,381.75
155	1,236.89	1,258.42	1,279.96	1,301.49	1,323.02	1,344.55	1,366.09	1,387.62	1,409.15
160	1,264.29	1,285.82	1,307.35	1,328.89	1,350.42	1,371.95	1,393.48	1,415.02	1,436.55

OPTIMUM TAILS ASSAY FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS

(percent U_{235})

Feed Cost (US$ per KgU as Natural UF_6)	SWU Price (US $ per SWU)																
	90	95	100	105	110	115	120	125	130	138.65	140	149.85	160	170	180	190	200
40	.316	.322	.327	.333	.338	.343	.347	.352	.356	.363	.364	.372	.379	.385	.391	.397	.402
45	.302	.308	.314	.320	.325	.330	.334	.339	.343	.350	.351	.359	.366	.373	.379	.384	.390
50	.291	.297	.302	.308	.313	.318	.323	.327	.332	.339	.340	.347	.354	.361	.367	.373	.379
55	.280	.286	.292	.297	.302	.307	.312	.317	.321	.328	.329	.337	.344	.351	.357	.363	.368
60	.271	.277	.282	.288	.293	.298	.302	.307	.311	.319	.320	.327	.334	.341	.347	.353	.359
65	.262	.268	.273	.279	.284	.289	.294	.298	.302	.310	.311	.318	.326	.332	.339	.345	.350
70	.254	.260	.265	.271	.276	.281	.285	.290	.294	.301	.302	.310	.317	.324	.330	.336	.342
75	.246	.252	.258	.263	.268	.273	.278	.282	.287	.294	.295	.302	.310	.316	.323	.329	.334
80	.239	.245	.251	.256	.261	.266	.271	.275	.279	.287	.288	.295	.302	.309	.316	.322	.327
85	.233	.239	.244	.249	.254	.259	.264	.268	.273	.280	.281	.288	.296	.302	.309	.315	.321
90	.227	.232	.238	.243	.248	.253	.258	.262	.266	.274	.275	.282	.289	.296	.302	.308	.314
95	.221	.227	.232	.237	.242	.247	.252	.256	.260	.268	.269	.276	.283	.290	.296	.302	.308
100	.216	.221	.227	.232	.237	.242	.246	.251	.255	.262	.263	.270	.278	.284	.291	.297	.302

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Table 3B

COST OF ENRICHED URANIUM (US $ per KgU as UF_6, 3 percent U_{235}) FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS (0.20% TA)

Feed Cost (US $ per KgU as Natural UF_6)	SWU Price (US $ per SWU)							
	138.65	140	149.85	160	170	180	190	200
40	816.26	822.08	864.50	908.21	951.27	994.34	1,037.40	1,080.47
45	843.66	849.48	891.89	935.60	978.67	1,021.73	1,064.80	1,107.86
50	871.06	876.87	919.29	963.00	1,006.07	1,049.13	1,092.20	1,135.26
55	898.46	904.27	946.69	990.40	1,033.46	1,076.53	1,119.59	1,162.66
60	925.85	931.67	974.09	1,017.80	1,060.86	1,103.93	1,146.99	1,190.06
65	953.25	959.06	1,001.48	1,045.19	1,088.26	1,131.32	1,174.39	1,217.45
70	980.65	986.46	1,028.88	1,072.59	1,115.66	1,158.72	1,201.79	1,244.85
75	1,008.84	1,013.86	1,056.28	1,099.99	1,143.05	1,186.12	1,229.18	1,272.25
80	1,035.44	1,041.26	1,083.67	1,127.39	1,170.45	1,213.51	1,256.58	1,299.64
85	1,062.84	1,068.65	1,111.07	1,154.78	1,197.85	1,240.91	1,283.98	1,327.04
90	1,090.24	1,096.05	1,138.47	1,182.18	1,225.24	1,268.31	1,311.37	1,354.44
95	1,117.63	1,123.45	1,165.87	1,209.58	1,252.64	1,295.71	1,338.77	1,381.84
100	1,145.03	1,150.85	1,193.26	1,236.97	1,280.04	1,323.10	1,366.17	1,409.23
105	1,172.43	1,178.24	1,220.66	1,264.37	1,307.44	1,350.50	1,393.57	1,436.63
110	1,199.83	1,205.64	1,248.06	1,291.77	1,334.83	1,377.90	1,420.96	1,464.03
115	1,227.22	1,233.04	1,275.46	1,319.17	1,362.23	1,405.30	1,448.36	1,491.43
120	1,254.62	1,260.43	1,302.85	1,346.56	1,389.63	1,432.69	1,475.76	1,518.82
125	1,282.02	1,287.83	1,330.25	1,373.96	1,417.03	1,460.09	1,503.16	1,546.22
130	1,309.41	1,315.23	1,357.65	1,401.36	1,444.42	1,487.49	1,530.55	1,573.62
135	1,336.81	1,342.63	1,385.04	1,428.76	1,471.82	1,514.88	1,557.95	1,601.01
140	1,364.21	1,370.02	1,412.44	1,456.15	1,499.22	1,542.28	1,585.35	1,628.41
145	1,391.61	1,397.42	1,439.84	1,483.55	1,526.61	1,569.68	1,612.74	1,655.81
150	1,419.00	1,424.82	1,467.24	1,510.95	1,554.01	1,597.08	1,640.14	1,683.21
155	1,446.40	1,452.21	1,494.63	1,538.34	1,581.41	1,624.47	1,667.54	1,710.60
160	1,473.80	1,479.61	1,522.03	1,565.74	1,608.81	1,651.87	1,694.94	1,738.00

OPTIMUM TAILS ASSAY FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS

(percent U_{235})

Feed Cost (US$ per KgU as Natural UF_6)	SWU Price (US $ per SWU)																
	90	95	100	105	110	115	120	125	130	138.65	140	149.85	160	170	180	190	200
105	.211	.216	.222	.227	.232	.236	.241	.245	.250	.257	.258	.265	.272	.279	.285	.291	.297
110	.206	.211	.217	.222	.227	.231	.236	.240	.245	.252	.253	.260	.267	.274	.280	.286	.292
115	.201	.207	.212	.217	.222	.227	.231	.236	.240	.247	.248	.255	.262	.269	.275	.281	.287
120	.197	.202	.208	.213	.218	.222	.227	.231	.235	.242	.243	.250	.258	.264	.271	.277	.282
125	.193	.198	.204	.209	.213	.218	.222	.227	.231	.238	.239	.246	.253	.260	.266	.272	.278
130	.189	.194	.200	.205	.209	.214	.218	.223	.227	.234	.235	.242	.249	.256	.262	.268	.273
135	.185	.191	.196	.201	.205	.210	.214	.219	.223	.230	.231	.238	.245	.251	.258	.264	.269
140	.182	.187	.192	.197	.202	.206	.211	.215	.219	.226	.227	.234	.241	.247	.254	.260	.265
145	.178	.184	.189	.194	.198	.203	.207	.211	.215	.222	.223	.230	.237	.244	.250	.256	.261
150	.175	.180	.185	.190	.195	.199	.204	.208	.212	.218	.219	.227	.234	.240	.246	.252	.258
155	.172	.177	.182	.187	.192	.196	.200	.204	.208	.215	.216	.223	.230	.237	.243	.248	.254
160	.169	.174	.179	.184	.188	.193	.197	.201	.205	.212	.213	.220	.227	.233	.239	.245	.251

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NUEXCO REPORT 174
EXECUTIVE SUMMARY

1982 Annual Review: Part 2 of 2

Part 2 of Nuexco's **Annual Review** features a review of price behavior in 1982 for secondary market SWU and a discussion of the development of a viable international secondary market for spot sales of enrichment services. It also reviews important market developments relative to Africa, Australia, Europe and the Far East.

Exchange Value Rose $1.25, to $21.50

The **Exchange Value** as of January 31, 1983 is **$21.50** per pound U_3O_8. Five uranium sales are reported, involving approximately 2.5 million pounds U_3O_8, *equivalent*. Two of the five transactions involved UF_6 and a third involved *enriched* UF_6.

Near-Term Supply-Demand Ratio is 2.0:1

Active spot and near-term **uranium** supply amounts to **9.4** million pounds U_3O_8, up 7 percent from last month. **Active** spot and near-term **uranium demand** rose to **4.7** million pounds U_3O_8, up 20 percent from last month. Therefore, the spot and near-term **supply-demand ratio** dropped slightly, to **2.0:1**.

Transaction Value Rose $0.55, to $19.35

The **Transaction Value** as of January 31, 1983 is **19.35** per pound U_3O_8. It includes 12 transactions involving a total of 5.4 million pounds U_3O_8 and covers a period of three months.

Conversion Value Down $0.25, to $1.20

The **Conversion Value** as of January 31, 1983 is **$1.20** per pound U as UF_6, down $0.25 since last month. No conversion transactions are reported. Active sellers are offering 3.3 million pounds U in near-term conversion services, up approximately 25 percent since last month. Active demand remained at 220 thousand pounds U. A total of 10-15 million pounds U of conversion services could become available in the coming months from six sources, located both in Europe and the US.

Loan Use Charge Rate Steady at 6 Percent

The **Loan Use Charge Rate** as of January 31, 1983 is **6 percent** per annum. No transactions are reported. This segment of the market is very quiet.

Enriched Uranium and SWUs

Although a number of 3.5-year DOE requirements contract holders are seeking secondary market supplies for FY 1983, Nuexco is not presently aware of any DOE sellers willing to offer prices low enough to make contract terminations attractive. There are, however, large quantities of Eurodif SWU being offered at discounts of approximately $35 from DOE's AFC price. The prevailing discount for DOE FY 1983 SWU remains at approximately $25 from the AFC price. Sellers of DOE SWU for delivery in FY 84 continue to offer discounts of $28-$30 from DOE's AFC price (at .2 tails). The market for DOE SWU for FY 1985 and later has virtually disappeared while potential sellers await DOE's announcement of the terms and conditions of conversion to the FR contract.

Raw Materials

Omitted this month to save space.

1982 Index

Lists references to articles which appeared in Reports 162-172. (The 1983 Index will cover Reports 173-184.)

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NUEXCO REPORT 174
FIGURES OF THE MONTH

	This Month	Last Month	12 Months Ago
		(Referenced to January 31, 1983)	
Exchange Value[1]	21.50	20.25	23.00
Transaction Value[1]	19.35	18.80	24.00
Conversion Value[2]	1.20	1.45	1.20
Loan Use Charge Rate[3]	6%	6%	6%
Near-Term Uranium Supply[4]	9.4	8.8	10.1
Near-Term Uranium Demand[5]	4.7	3.9	4.0
Near-Term Supply-Demand Ratio	2.0	2.3	2.5
Current Transactions[6]:			
Number of Transactions	5	9	3
Quantity of Material[7]	1.5-2.8	8.7-22.4	0.3-0.9
USDOE SWU Prices[8]:			
AFC	138.65	138.65	130.75
Requirements	149.85	149.85	138.37
Optimum Tails Assay[9]	.321	.327	.308
Calculated Price of Enriched UF_6[10] [11]:			
2.5 w/o U_{235}	711.17	698.99	703.19
3.0 w/o U_{235}	917.87	903.04	905.18
3.5 w/o U_{235}	1,128.71	1,111.24	1,111.09
4.0 w/o U_{235}	1,342.62	1,322.50	1,319.88

---

[1] US $ per pound U_3O_8 equivalent
[2] US $ per pound U as UF_6
[3] Per annum
[4] Active inquiries to sell, for delivery within 12 months after contract signing (millions of pounds U_3O_8)
[5] Active inquiries to purchase, for delivery within 12 months after contract signing (millions of pounds U_3O_8)
[6] Uranium transactions only; does not include loans, conversion, or SWU transactions
[7] Millions of pounds U_3O_8, equivalent
[8] US $ per SWU
[9] Percent U_{235}.
[10] Theoretical calculation based on Exchange Value, Conversion Value, 0.20 percent tails assay and the USDOE price for AFC SWUs.
[11] US $ per KgU as UF_6

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MARCH 1983 NUMBER 175

Monthly Report on the Nuclear Fuel Market

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NUEXCO REPORT 175
EXECUTIVE SUMMARY

Exchange Value Rose $0.25, to $21.75

The **Exchange Value** as of February 28, 1983 is **21.75** per pound U_3O_8. Five uranium sales are reported, involving approximately 1.1 million pounds U_3O_8, *equivalent*. One of the five transactions involved natural UF_6, and one involved *enriched* UF_6.

Near-term Supply-Demand Ratio Rose to 3.1:1

Active spot and near-term **uranium supply** amounts to ***8.6 million*** pounds U_3O_8 *equivalent*, down 9% from last month. **Active** spot and near-term **uranium demand** dropped to **2.8 million** pounds U_3O_8 equivalent, down 40% from last month. Therefore, the spot and near-term **supply-demand ratio** rose 50 percent, to **3.1:1**.

Transaction Value Rose $0.65, to $20.00

The **Transaction Value** as of February 28, 1983 is **$20.00** per pound U_3O_8. It includes 11 transactions involving a total of 4.2 million pounds U_3O_8 and covers a period of three months.

Conversion Value Rose $0.20, to $1.40

The **Conversion Value** as of February 28, 1983 is **$1.40** per pound U as UF_6, up 20 cents since last month. No conversion transactions are reported. Active sellers are offering 2.6 million pounds U in near-term conversion services, down 20% since last month. Active demand rose to 920 thousand pounds U.

Loan Use Charge Rate Steady at 6%

The **Loan Use Charge Rate** as of February 28, 1983 is **6 percent** per annum. No loan transactions are reported. This segment of the market is very quiet.

Nuexco Introduces SWU Value

This Report introduces the Nuexco SWU Value, Nuexco's judgment of the price, expressed in US $ per SWU, at which transactions for the sale of significant quantities of SWU of any origin for delivery in the specified DOE fiscal year could be concluded as of the last day of the month.

SWU Values:
FY 83 $103
FY 84 $110

As of February 28, 1983, the **SWU Value for FY83** is **$103 per SWU** and the **SWU Value for FY84** is **$110**. Those prices reflect the dominance of the market by sellers of large quantities of Eurodif SWUs, who are offering substantial discounts at high tails assays. Prices offered by those few sellers of DOE SWU remaining in the market are approximately $115 per SWU (referenced to .2 tails and 3% enrichment). The only potential buyers for significant quantities of FY83 SWU on the secondary market are holders of DOE requirements contracts having 3.5-year termination provisions. A few buyers seeking to purchase small quantities of SWU above their contract amounts will have to pay significantly more than the FY83 SWU Value, due to the small lot size.

For FY84 SWUs, there is no large differential between prices being offered by sellers of DOE and Eurodif SWUs. The market for FY85 and beyond remains quiet, awaiting DOE's revelation of the terms and conditions of conversion to the FR contract.

Raw Materials

Discusses the Crow Butte Uranium Deposit.

Recent Developments

Features items of interest on South Africa, Australia, Europe, Japan, Taiwan and the US.

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NUEXCO REPORT 175
FIGURES OF THE MONTH
(Referenced to February 28, 1983)

	This Month (Report 175)	Last Month (Report 174)	12 Months Ago (Report 163)
Exchange Value[1]	21.75	21.50	23.00
Transaction Value[1]	20.00	19.35	23.70
Conversion Value[2]	1.40	1.20	1.20
Loan Use Charge Rate[3]	6%	6%	6%
Near-Term Uranium Supply[4]	8.6	9.4	10.9
Near-Term Uranium Demand[5]	2.8	4.7	3.3
Near-Term Supply-Demand Ratio	3.1	2.0	3.3
Current Transactions[6]:			
Number of Transactions	5	5	4
Quantity of Material[7]	0.8-1.8	1.5-2.8	1.3-2.5
SWU Prices[8]:			
Nuexco SWU Values:			
FY 83	103	—	—
FY 84	110	—	—
USDOE SWU Prices:			
AFC	138.65	138.65	130.75
Requirements	149.85	149.85	138.37
Market Value of Enriched UF_6[9, 10]:			
2.5 w/o U_{235}	600.94	711.17	703.19
3.0 w/o U_{235}	770.28	917.87	905.18
3.5 w/o U_{235}	942.70	1,128.71	1,111.09
4.0 w/o U_{235}	1,117.40	1,342.62	1,319.88

---

[1] US $ per pound U_3O_8 equivalent
[2] US $ per pound U as UF_6
[3] Per annum
[4] Active inquiries to sell, for delivery within 12 months after contract signing (millions of pounds U_3O_8)
[5] Active inquiries to purchase, for delivery within 12 months after contract signing (millions of pounds U_3O_8)
[6] Uranium transactions only; does not include loans, conversion, or SWU transactions
[7] Millions of pounds U_3O_8, equivalent
[8] US $ per SWU
[9] Calculated using the Nuexco Exchange Value, Conversion Value, and 0.20 percent tails assay. Calculations before 2/28/83 used the USDOE price for AFC SWUs. As of 2/28/83, calculations use the Nuexco SWU Value for the relevant fiscal year (currently FY 83).
[10] US $ per KgU as UF_6

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MONTHLY REPORT ON THE URANIUM MARKET

March 1983 No. 175

R. WESLEY MILLER, *EDITOR*

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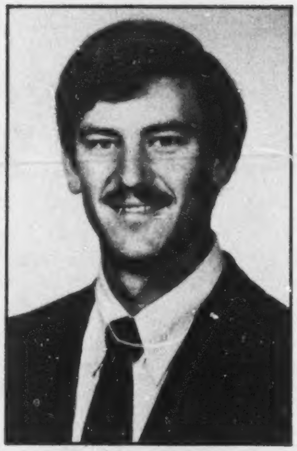

Nuexco will host a hospitality suite during the Atomic Industrial Forum's Fuel Cycle Conference '83. The suite will be at the Westin Crown Center in Kansas City, Missouri, March 20-23. The suite number will be posted in the hotel lobby on Sunday afternoon. We look forward to seeing you in Kansas City.

* * *

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* * *

Bob Alexander has been transferred to our Northeast US office. Bob can now be reached at

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Stamford, Connecticut 06901
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* * *

Nuexco passed another milestone on February 28, when Mrs. Elizabeth Bryant retired. Betty, as she was known to many of our customers, joined the Company in 1971 as secretary to Mr. George White, Sr., who was then president. She continued in that capacity following Mr. White's retirement in 1976.

Betty is a rare person whose work and personal character have been admired by all. We like to think of her as representing the best of Nuexco. She will be missed by her associates, all of whom wish her well in this new step in life.

Mr. Wolcott's new secretary is Mrs. Kathie Kuziel, known to most of our subscribers and friends as the able young lady who manages Nuexco's hospitality suites, luncheons and other functions.

PRICING

NATURAL URANIUM AND CONVERSION

The **Exchange Value** as of February 28, 1983 rose for the fifth consecutive month, to **$21.75** per pound U_3O_8, up $0.25 since last month. The sustained buying activity of the past six months diminished further. The *Current Market Data* section lists five uranium sales, covering a total of approximately 1.1 million pounds U_3O_8 *equivalent*. Three of the transactions involved uranium concentrates (U_3O_8), one involved natural uranium hexafluoride (UF_6), and one involved enriched UF_6.

Active spot and near-term supply of uranium (material offered at competitive prices, terms and other conditions) amounts to **8.6** million pounds U_3O_8, equivalent, down 9 percent from last month's level of 9.4 million. **Active spot and near-term demand** dropped to **2.8** million pounds U_3O_8 equivalent, down 40 percent from last month. Therefore, the spot and near-term **supply-demand ratio** rose 50 percent, to **3.1:1.**

* * *

The **Transaction Value** as of February 28, 1983 is **$20.00** per pound U_3O_8, up $0.65 from a month ago. The current Transaction Value includes 11 transactions involving a total of 4.2 million pounds U_3O_8 equivalent, and covers a period of three months.

* * *

The **Conversion Value** as of February 28, 1983 is **$1.40** per pound U as UF_6, up $0.20 from last month. **Active inquiries to sell** conversion services within one year total **2.6** million pounds U, down approximately 20 percent since last month. **Active inquiries to buy** conversion services within one year rose to **920 thousand** pounds U as UF_6. There are no conversion transactions reported this month.

* * *

The **Loan Use Charge Rate** remained at six percent per annum. The limited activity in the market is taking place at or near that level, but there are few participants. No loan transactions are reported this month.

* * *

The Exchange Value edged upward this month to another 25 cents per pound U_3O_8. There are at least four sellers willing to discuss sales of one million pounds U_3O_8 or more at current price levels. An upward trend seen during February lost some of its momentum and leveled off toward the end of the month as transactions were completed. The U_3O_8 market is still characterized by the unusually wide price distribution noted last month.

The Conversion Value's upward movement was due to the emergence of a new block of active demand and to the withdrawal from the secondary market of one aggressive seller's large quantity of conversion services. The remaining sellers have all indicated their willingness to discuss transactions at current price levels. This market is characterized by very small numbers of sellers and, especially, buyers. As such, it remains vulnerable to extreme price movements in either direction; such price movements could be triggered by the actions of any one of numerous market participants.

THE SWU VALUE

Beginning this month, Nuexco will publish one or more secondary market spot prices for enrichment services. The **SWU Value** represents Nuexco's judgment as to the price at which transactions for enrichment services, *for the specified DOE fiscal year*, could be concluded as of the end of the month. The complete definition and derivation are reprinted in the following paragraphs, but three qualifications are in order:

1. Although Nuexco has designed the definition to respond to changes in market conditions and the quantity and quality of information available, the SWU Value is determined by means of a combination of objective data and the subjective judgment of Nuexco's senior staff. It describes, by means of spot price, the state of the secondary SWU market as of the last day of the month.
2. The current excess of supply over demand has led to a situation in which secondary market SWU prices and the SWU Value are lower than the contractual purchase prices of most SWU sellers. The SWU Value *in no way* relates to historical costs or to the price level needed to provide a minimum acceptable rate of return on investment.
3. Nuexco will be publishing the SWU Value(s) each month, only for those USDOE fiscal years for which firm prices are available, usually the current fiscal year and the next.

Definition

The SWU (Separative Work Unit) Value is Nuexco's judgment of the price, expressed in US dollars per SWU, at which transactions for the sale of significant quantities of SWU of any origin for delivery in the specified DOE fiscal year could be concluded as of the last day of the month.

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PRICING

Derivation

Nuexco bases the SWU Value upon:

A. Data from recently completed transactions

B. Data from pending transactions

C. Firm bids to buy and firm offers to sell

D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

E. SWU prices at varying tails assays and varying product assays are converted to the equivalent SWU price at the DOE Reference Transaction Tails Assay (presently 0.20 weight percent U_{235}) and a product assay of three percent U_{235} assuming feed costs calculated using the Nuexco Exchange Value and Nuexco Conversion Value determined as of the last day of the same month.

Comments

Nuexco does not consider the following in determining the SWU Value:

A. The price of SWU delivered under long-term contracts from primary suppliers, such as DOE, Urenco, or Eurodif.

B. The price of SWU delivered under other than arm's length transactions.

Evolution of the Secondary SWU Market

The secondary market for enrichment services has undergone a fundamental change during the past few years. From a limited market characterized by assignments of Fixed-Commitment contracts from one US DOE customer to another, it has developed into a truly worldwide secondary market. Utilities are making use of the secondary SWU market as an integral part of their overall fuel procurement strategies, much as they have been using the spot markets for conversion services and natural uranium. Many have expressed hope that the secondary SWU market remains active for the long term.

Many of the factors driving this market are the same as those driving the U_3O_8 and conversion markets. Over-optimistic demand projections, contracting far in advance of need, reactor cancellations and deferrals, supply overcapacity, inventory accumulation, and high carrying costs combined to produce in many market participants a strong desire to sell excess inventories and obligations. Thus, the growing interest in the secondary market for enrichment services has led to increases in both market opportunities and completed transactions.

By the beginning of 1980, the market for new reactor orders had virtually ceased to exist, so few new enrichment contracts were being signed and the market for assignments of complete enrichment contracts vanished. Moreover, continual reactor cancellations and construction delays caused more and more SWU to become available in the near term. As sellers increased discount levels to stimulate demand, buyers and sellers began communicating more openly and more actively with one another.

Reactor delays and cancellations continued to aggravate the oversupply condition on the secondary market. More open exchange of information enabled the market to respond in classic fashion; prices dropped enough to make it profitable for holders of DOE requirements contracts having 3.5-year termination provisions to use secondary market SWU purchases to replace existing commitments. By the end of 1982, certain of those customers had become willing to cancel their DOE contracts *long term*, without first buying replacement SWUs, thereby depending on the secondary market for future services. At this point, it could be said that a truly worldwide secondary market had developed. (Last month's Report #174 discusses the development of the secondary SWU market in greater detail.)

Implications for the Fuel Buyer

When the Nuexco SWU Value for FY83 rather than the DOE price for AFC SWUs is used to calculate the marginal cost of enriched uranium, the cost is 16-17 percent lower. Table 1 shows a comparison of the two calculations for product assays ranging from 2.5 percent to 4.0 percent. Both calculations use Nuexco's Exchange Value and Conversion Value and assume a tails assay of 0.2 percent U_{235}.

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Table 1

MARGINAL COST[1] OF ENRICHED UF$_6$ ($/Kg U)

Percent U$_{235}$	Using DOE Price for AFC SWUs	Using Nuexco SWU Value for FY83	Difference	Percent Difference
2.5	$716.05	$600.94	$115.11	16
3.0	$923.81	$770.28	$153.53	17
3.5	$1,135.71	942.70	$193.01	17
4.0	$1,350.68	$1,117.40	$233.28	17

[1] **Calculated using 0.2% tails assay, Nuexco Exchange Value and Nuexco Conversion Value as of 2/28/83.**

ENRICHED URANIUM AND SWUs

The **SWU Value for FY 1983 is $103.00 per SWU.** This price reflects the dominance of the market by large scale Eurodif sellers who are offering significant discounts at high tails assays for large blocks of SWU. In contrast, most aggressive sellers of DOE FY 1983 SWUs, those having the advantage of holding high tails assays, have already sold out and have withdrawn from the market. Prices offered by those DOE sellers still remaining are presently about $115 per SWU at .2 tails. Under those conditions, there is no economic incentive for a DOE customer to terminate on short notice and replace with DOE SWUs.

The only potential buyers of significant size for FY 1983 are holders of DOE requirements contracts having 3.5-year termination provisions, who would have to terminate before buying replacement SWU on the secondary market. These buyers may choose either to purchase Eurodif SWU or retain their requirements contract deliveries. There are in addition a few small buyers who are seeking SWU above their requirements contract ceilings. These buyers will have to pay prices significantly above the FY 1983 Value due to the lack of interest among Eurodif sellers in selling small blocks of SWU.

The **SWU Value for FY 1984** is **$110 per SWU**. Prices in this range are being offered by both Eurodif and DOE SWU sellers. There is no large differential between the price offered by DOE and Eurodif sellers as there is for 1983, since there remains available for 1984 a large surplus of both Eurodif and DOE SWU at high tails assays. Demand for 1984 SWU should increase substantially in the next few months as a number of DOE requirements contract holders, previously unwilling to terminate and commit to secondary market supplies until reactor schedules become more firm, begin entering the market.

The market for FY 1985 SWU and later remains quiet as potential DOE sellers await DOE's announcement of the terms and conditions of conversion to the FR contract. There is some Eurodif material available for long-term delivery at fixed prices, but there has been little interest in such offers among buyers.

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CURRENT MARKET DATA

EXCHANGE VALUE $21.75/lb. U_3O_8
Determined as of February 28, 1983

Definition[1]

The Exchange Value is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the last day of the month.

Derivation

Nuexco bases the Exchange Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Exchange Value:

A. The price of uranium delivered or to be delivered under old contracts.
B. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.

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[1] In December, 1981, Nuexco published a history of the Exchange Value which chronicled, month-by-month, changes in its definition, usage and derivation. Copies are available upon request.

TRANSACTION VALUE[2]
Determined as of February 28, 1983

$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
20.00	4.2	11	3

Definition

The Transaction Value is a weighted average price of recent transactions, and is based on prices paid for U_3O_8 in transactions closed within the previous three-month period and for which delivery was scheduled within one year of the transaction date. At least ten transactions totaling at least two million pounds U_3O_8 are included in each calculation, or the sample time is extended as necessary to include these minima. Foreign currencies are converted to US dollars as of the transaction date.

Comments

Nuexco does not consider the following in determining the Transaction Value:

A. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.
B. The price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of Exchange Value or any other independent variable. Also excluded from consideration are all data where the delivery price is defined in such a way that it cannot currently be determined.

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[2] Transaction Values for 1976 through 1981 and their associated parameters (millions of pounds, number of transactions and number of months) are tabulated on pages 31 and 32 of Report 161. Corresponding data for 1982 are tabulated on page 5 of Report 173.

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CONVERSION VALUE[1] $1.40/lb. U as UF_6
Determined as of February 28, 1983

Definition

The Conversion Value is Nuexco's judgment of the price at which spot and/or near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the last day of the month.

Derivation

Nuexco bases the Conversion Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Conversion Value:

A. The price of conversion services delivered or to be delivered under old contracts.
B. The price of conversion services delivered in connection with contract renegotiations or other than arm's length transactions.

[1] Monthly data for 1981 and 1982 are tabulated on page 6 of Report 173.

LOAN USE CHARGE RATE[2] 6%
Determined as of February 28, 1983

Definition

The Loan Use Charge Rate is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the last day of the month.

Derivation

Nuexco bases the Loan Use Charge Rate upon:

A. Data from recently completed or pending loan transactions.
B. Rates included in firm proposals to borrow or lend.
C. Rates that potential borrowers and lenders have expressed as a willingness to pay or accept, but for which Nuexco is not aware of firm proposals.

[2] Monthly data for 1968 through 1981 appear on pages 32-34 of Report 162. Monthly data for 1982 appear on page 2 of Report 173.

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CURRENT MARKET DATA

SWU VALUE $103/SWU for FY83
SWU VALUE $110/SWU for FY84
Determined as of February 28, 1983

Definition

The SWU (Separative Work Unit) Value is Nuexco's judgment of the price, expressed in US dollars per SWU, at which transactions for the sale of significant quantities of SWU of any origin for delivery in the specified DOE fiscal year could be concluded as of the last day of the month.

Derivation

Nuexco bases the SWU Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.
E. SWU prices at varying tails assays and varying product assays are converted to the equivalent SWU price at the DOE Reference Transaction Tails Assay (presently 0.20 weight percent U_{235}) and a product assay of three percent U_{235} assuming feed costs calculated using the Nuexco Exchange Value and Nuexco Conversion Value determined as of the last day of the same month.

Comments

Nuexco does not consider the following in determining the SWU Value:

A. The price of SWU delivered under long-term contracts from primary suppliers, such as DOE, Urenco, or Eurodif.
B. The price of SWU delivered under other than arm's length transactions.

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EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates	per kg U_3O_8 in Concentrates	per kg U in Concentrates
Australia (dollar)	22.63	49.89	58.83
Belgium (comm. franc)	1,031	2,273	2,680
Canada (dollar)	26.70	58.87	69.42
Finland (markka)	116.94	257.80	304.01
France (franc)	148.87	328.20	387.03
FRG (Deutschmark)	52.41	115.54	136.25
Italy (lira)	30,208	66,598	78,535
Japan (yen)	5,106	11,256	13,274
Netherlands (guilder)	57.97	127.80	150.71
South Africa (rand)	23.45	51.69	60.95
Spain (peseta)	2,825	6,227	7,344
Sweden (krona)	161.23	355.45	419.16
Switzerland (franc)	44.09	97.20	114.63
UK (pound)	14.23	31.36	36.98
US (dollar)	21.75	47.95	56.55

TRANSACTION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates	per kg U_3O_8 in Concentrates	per kg U in Concentrates
Australia (dollar)	20.81	45.88	54.10
Belgium (comm. franc)	947.87	2,090	2,464
Canada (dollar)	24.55	54.13	63.84
Finland (markka)	107.53	237.06	279.55
France (franc)	136.89	301.80	355.89
FRG (Deutschmark)	48.19	106.25	125.29
Italy (lira)	27,778	61,239	72,216
Japan (yen)	4,695	10,350	12,206
Netherlands (guilder)	53.30	117.52	138.58
South Africa (rand)	21.56	47.53	56.05
Spain (peseta)	2,597	5,726	6,753
Sweden (krona)	148.26	326.85	385.44
Switzerland (franc)	40.54	89.38	105.40
UK (pound)	13.08	28.84	34.01
US (dollar)	20.00	44.09	52.00

[1] Calculated using currency exchange rates published in the Wall Street Journal on February 28, 1983

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CURRENT MARKET DATA

CONVERSION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U as UF_6	per kg U as UF_6
Australia (dollar)	1.46	3.21
Belgium (comm. franc)	66.35	146.28
Canada (dollar)	1.72	3.79
Finland (markka)	7.53	16.59
France (franc)	9.58	21.13
FRG (Deutschmark)	3.37	7.44
Italy (lira)	1,944	4,287
Japan (yen)	328.64	724.52
Netherlands (guilder)	3.73	8.23
South Africa (rand)	1.51	3.33
Spain (peseta)	181.82	400.84
Sweden (krona)	10.38	22.88
Switzerland (franc)	2.84	6.26
UK (pound)	0.92	2.02
US (dollar)	1.40	3.09

SWU VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	FY 1983 per SWU	FY 1984 per SWU
Australia (dollar)	107.17	114.45
Belgium (comm. franc)	4,882	5,213
Canada (dollar)	126.46	135.05
Finland (markka)	553.76	591.40
France (franc)	705.00	752.91
FRG (Deutschmark)	248.19	265.06
Italy (lira)	43,056	52,778
Japan (yen)	24,178	25,822
Netherlands (guilder)	274.52	293.18
South Africa (rand)	111.03	118.57
Spain (peseta)	13,377	14,286
Sweden (krona)	763.53	815.42
Switzerland (franc)	208.80	222.99
UK (pound)	67.36	71.94
US (dollar)	103.00	110.00

[1] Calculated using currency exchange rates published in the Wall Street Journal on February 28, 1983.

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TRANSACTION SUMMARY[1]

Uranium Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current E.V.	Seller	Buyer	Remarks
2148	1983	301-600	unknown	European Utility	European Entity	Enriched UF_6
2151	unknown	101-300	94	Canadian Producer	unknown	
2154	1983	Less than 50	100	US Producer	US Producer	
2164	1983	301-600	93	European Entity	European Utility	UF_6
2189	1983	101-300	100	US Producer	US Utility	

Conversion Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U equivalent)	Approximate Price as Percent of Current C.V.	Seller	Buyer	Remarks

There are no conversion transactions reported this month

Loan Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current L.U.C.R.	Lender	Borrower	Remarks

There are no loan transactions reported this month.

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[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.

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CURRENT MARKET DATA

URANIUM SUPPLY
(As of 2/28/83)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8)		Remarks
	Within 1 Year	Beyond 1 Year	
Available for Sale:			
ACTIVE			
1575		500 per year	Long Term
1610	25		
1818		300 per year	Long Term
1921	2,100		UF_6
2017		2,300	
2038	2,000		UF_6
2056	2,200		UF_6
2126	500		UF_6
2158	500		
2203	1,200		
2216	100		
TOTAL:	8,625		
INACTIVE			
1581		100 per year	Long Term
1805		500 per year	Long Term
1877	100		
1928	1,000		UF_6
2134		300 per year	Long Term
2196	500		
TOTAL:	1,600		

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[1] Measured from the date of this Report

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URANIUM DEMAND
(As of 2/28/83)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8)		Remarks
	Within 1 Year	Beyond 1 Year	
Inquiries to Purchase:			
ACTIVE			
1652		400 per year	Long Term
1871		250 per year	1983-86
1995	250		
1996		400	
2010		400 per year	1984-92
2030		1,000	1984-85
2042		400 per year	Long Term
2061	25		
2105	600		UF_6
2123	500	500 per year	1983-87
2130	20		UF_6
2149	50		
2152		750 per year	Long Term
2159	1,100		
2167	250	250+ per year	1984-99
TOTAL:	2,795		
INACTIVE			
1459		200 per year	Long Term
1843	250		
1888		400 per year	Long Term
1999		50 per year	1985-90
2025		350	
2032		200	
2114	200	200 per year	1984-90
2115	200	200	
TOTAL:	650		

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[1] Measured from the date of this Report.

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CURRENT MARKET DATA

CONVERSION SUPPLY
(As of 2/28/83)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U as UF_6)		Remarks
	Within 1 Year	Beyond 1 Year	
ACTIVE			
1609	500	1,500 per year	Long Term
1840	130		
1936	1,000	200 per year	Long Term
2051	1,000		
2143		400	
TOTAL:	2,630		
INACTIVE			
2008	800	800	
2181	650	650 per year	Long Term
TOTAL:	1,450		

CONVERSION DEMAND
(As of 2/28/83)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U as UF_6)		Remarks
	Within 1 Year	Beyond 1 Year	
ACTIVE			
1995	220		
2129	500	500	
2140	200		
2148		400 per year	1984-90
TOTAL:	920		
INACTIVE	None		

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[1] Measured from the date of this Report.

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LOAN SUPPLY AND DEMAND
(As of 2/28/83)

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Within 1 Year	Beyond 1 Year	Remarks
Available for Loan:			
ACTIVE			
1938	1,500		
2006A	600		
2121	600		
2204	500	200 per year	Long Term
TOTAL:	3,200		
INACTIVE			
1815	1,000		UF_6
1884	600		
1910	1,000		
1931	600		
2036	500		UF_6
2040	600		UF_6
2133	200		
2139	2,000		
2157	600		
TOTAL:	7,100		
Inquiries to Borrow:			
ACTIVE			
1998	200	200	
2006	600		
2070	200		UF_6
TOTAL:	1,000		
INACTIVE	None		

[1] Measured from the date of this Report

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RECENT DEVELOPMENTS

AFRICA

As of February 6, the **South African** authorities removed all exchange controls for non-residents and abolished the dual exchange rate for the rand which had existed since 1961. Non-residents are now permitted to transfer funds into and out of the country freely at a single exchange rate. Previously, all such funds had to be transferred by way of the financial rand, the effective investment currency for non-residents. Traditionally, the financial rand had been discounted against the commercial rand, reflecting the degree of risk foreign investors perceived as inherent in investments in South Africa.

The initial reaction on regional financial markets was mild. The value of the rand on Monday, February 7, fell to 87-88 US cents and domestic interest rates rose slightly. As it became evident that there had been no flight of funds on a major scale, the rand rebounded to 93 US cents (as of February 28) and interest rates returned to prior levels.

The most important effect of the move will be an improvement in South African mines' revenues (in rand terms) from gold sales. This will also apply to any uranium contracts priced in US dollars. The lack of a mass withdrawal of foreign investment currency would appear to confirm the government's belief that the strength of gold, the improvement in South Africa's balance of payments, and recent political moves towards a new constitution to include non-white races, have substantially improved South Africa's standing in the eyes of the international investing community.

AUSTRALIA

Energy Resources of Australia Limited (ERA) reported a net profit of A$ 24 million for the six months ending December 31, 1982. This profit was earned on revenues of A$ 126 million. Uranium production amounted to 3.7 million pounds U_3O_8, slightly more than rated capacity.

* * *

Pancontinental Mining Limited, operator of the Jabiluka joint venture (65 percent Pancontinental, 35 percent Getty Oil Development) is inviting submissions from engineering management groups to offer their services for the project. The company expects to require these services later this year.

Respondents to the invitation will probably include Bechtel, Fluor and Dravo. In addition, Pancontinental is inviting tenders for access road and bridge construction in the Northern Territory from the Arnhem highway to the boundary of the project area. Although the company appears to have recently come to an understanding with the Central Electricity Generating Board (CEGB) of the United Kingdom for the delivery over 10 years of 4.3 million pounds of U_3O_8 (including options) starting in 1988, it seems unlikely that the joint venture partners will commit the funds necessary to construct the total project unless much stronger market support is forthcoming.

* * *

The South Australian Labor Party (ALP) Government has offered a decision on the Honeymoon uranium project. This stance leaves South Australia's state government uncommitted until after the federal elections on March 5, 1983. Mr. Hawke, the new ALP leader, has been quoted as saying that, should the Labor party gain office in Canberra, the controversial uranium policy adopted last August (and discussed in some detail in Nuexco Report 168) will "be given effect for concrete proposals." That probably means that the ALP would allow existing mines to continue operating, but would prohibit any new developments.

Recent elections in Western Australia have shown considerable voter preference for Labor which gained 53 percent of the primary vote, unseating the Liberal party after nine years in office. State elections, however, seldom signal voter preferences for the federal parliament correctly.

* * *

The Yeelirrie uranium project (Western Mining Corporation) is likely to experience delays as the new state government comes to terms with the policy issues involved. Potential foreign partners or buyers will most likely adopt a wait-and-see position before entering into serious commitments with this potential supplier.

* * *

The Australian Labor Party (ALP) under its new leader Robert (Bob) Hawke won a decisive victory in the federal elections on March 5. When the counting began on polling day it became obvious from the start that the Fraser government was in trouble. The electorate favored the ALP in all of the mainland states. The ALP took 20 seats from the liberals and 2 seats from the National Party, its coalition partner.

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Mr. Hawke will govern with a majority of 25 or 27 seats in the House of Representatives (Lower House). However, the electorate did not give the ALP a full mandate in the Senate (Upper House). Labor gained only 30 of the 64 seats, with the Australian Democrats again holding the balance of power. This should hold no fears for the ALP as the Democrats have sided with Labor on many issues. The necessity for the government to consider the attitudes of a third party when framing its legislation is not unusual in Australian politics. The former coalition government also had to work without a Senate majority. For Mr. Fraser, this was a rather frustrating experience. At the time when he called the election, which was officially due much later in the year, 13 pieces of legislation had been defeated in the Senate.

Mr. Fraser has resigned from the leadership of the Liberal Party. Having seen its leadership repudiated, the Liberal Party faces a huge rebuilding task. The party suffered severe setbacks in Queensland and Western Australia. Elsewhere it has been reduced to a handful of metropolitan seats. Therefore, it would not be surprising for the ALP to govern Australia for more than one three-year term.

During the campaign, it became clear that this election dealt with issues deeper than theories of economic management. What caused the demise of the Fraser government? Mr. Hawke offered consensus, Mr. Fraser countered with confrontation. Mr. Hawke offered hope, Mr. Fraser countered by selling fear.

Mr. Hawke and his team presented a credible picture to the Australian people. Whether the ALP as a party can curb its militant left wing and fulfill the expectations of the electorate must remain an open question, but the majority of Australians are prepared to give them the opportunity.

EUROPE

In **Portugal**, Sr. Ricardo Bayao Horta, the Minister for Industry and Energy, has presented a national energy plan calling for Portugal to choose a nuclear energy program by mid-1984. If no decision has been made by that time to build four 1000 MWe nuclear reactors, the country will have to rely more heavily on coal, even though Portugal's 8000 metric tons of measured uranium reserves could be used to reduce energy imports in the long run.

Portugal is dependent on outside sources for all of its oil, most of its coal, and 25 percent of its electricity. Severe drought conditions in Portugal, which have led to hydro-electric reserves falling to a very low level, underline the importance of the decisions to be taken.

* * *

In the **United Kingdom**, the design contract for the pressure vessel for Sizewell B has gone to Framatome. More importantly, Framatome will also get the construction contract if Sizewell B is approved.

The UK uranium purchasing authorities have announced their intention not to renew the UK uranium contract with Rio Tinto-Zinc's Rossing mine in Namibia because the country has a huge uranium stockpile. In a written parliamentary reply to a House of Commons question, the Energy Department Under-Secretary, Mr. John Moore, said the Central Electricity Generating Board (CEGB) had "no plans to obtain further uranium from Namibia" after the contract with Rossing expires in 1984. A CEGB spokesman said stocks are more than sufficient to supply the country's uranium needs for several years. Although the exact size of the stockpile is secret, a reasonable estimate would be great er than 20 million pounds U_3O_8, an amount sufficient to supply Britain's nuclear power program for six years at current consumption rates.

After a trip to Namibia, Kenneth Marsden, the mining editor of the Financial Times, reported that Rossing was producing at only 93 percent of its design rate of 10.5 million pounds of uraniun oxide a year. That could indicate that Rossing would have difficulty finding other customers for the output that has been going to the UK. In that event, production rates could fall to levels at which the operation would become uneconomic.

On the one hand, the UK is diversifying its sources of supply and has announced a tentative agreement to buy uranium from Pancontinental (Australia). However, the decision to end the Rossing contract shows that the CEGB has more than sufficient uranium, so it will not necessarily need to buy more uranium from Australia or any other suppliers.

In last year's annual report, RTZ said Rossing contributed 63 million pounds sterling, or 18 percent, of its pre-tax profit in 1981. RTZ's net beneficial interest in Rossing is 46.5 percent. General Mining has a 2.3 percent share in Rossing and the Industrial Development Corporation has 13.5 percent. Other shareholders include the French consortium Minatome and Urangesellschaft. Table 2 shows a breakdown of Rossing's ownership.

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RECENT DEVELOPMENTS

Table 2

ROSSING'S OWNERSHIP BREAKDOWN

Rossing Shareholders	Percentage of Ownership
RTZ	41.35
Rio Algom[1]	10.0
Industrial Development Corp. of South Africa	13.5
Minatome (France)	10.0[2]
Urangesellschaft (West Germany)	5.0[2]
General Mining Corp.	2.3
AEOE (Iran)	15[2]
Unknown	3[2]

[1] RTZ owns 51.3% of Rio Algom, so RTZ's net beneficial interest in Rossing is 46.5%.

[2] Nuexco estimate

* * *

The results of the **West German** federal election on March 6 are presented in Table 3. The implications of these results are twofold. First, because the Free Democrats will align with the Christian Democrats to control the government, Helmut Kohl should remain Chancellor for the next four years. This is seen as a victory for the conservatives. The German economy should improve as a result, and indirectly this is favorable for nuclear power.

Table 3

GERMAN ELECTION RESULTS

Parties	Vote Percentage	Number of Seats
Christian Democrats	48.8	244
Free Democrats	6.9	34
Social Democrats	38.2	191
Green Party	5.6	27
	100	496

Second, for the first time the Green Party will be represented in Parliament. They achieved this by winning more than 5 percent of the vote. It should be interesting to note how the relatively young members of the Party react to this new responsibility, even though they are not likely to have any effect on government policies.

The control of government by the Christian Democratic Party is expected to be positive for the German economy in general and for the nuclear power industry in particular, since the Christian Democratic Party has called for rapid expansion of the Nuclear Electric Generation in Germany.

FAR EAST

In Nuexco Report 165 of May 1982, Nuexco observed that **Japan**'s announced plans for 54 nuclear units and 46,619 MWe in operation by March 1991 appeared overly ambitious, and were unlikely to be realized. It was suggested that "a more realistic scenario would be a continuation of the historical trend" that "would result in some 44 or 45 units and some 36,000 to 37,000 MWe in service by March 31, 1991."

Japan's utilities recently announced that a "realistic capacity" by the end of March 1991 would be 45 reactors totaling 37,350 MWe. This downward shift reflects adjustments associated with siting problems, as well as a continuation of lower-than-expected rates of electric growth.

Based on Nuexco's reevaluation of the Japanese situation, it is our opinion that the "quite conservative" scenario mentioned last month in Report 174 is a more realistic estimate for planning purposes. We now forecast a total of 41 nuclear units and approximately 33,500 MWe in operation in Japan by March 1991. The Japanese utilities' plans call for an additional 10 units, not yet under construction, to be completed and operating by that time, but Nuexco believes no more than six will be added by that date. Table 4 compares the two forecasts as of March 1991. Table 5 provides an annual breakdown and comparison of the utilities' plans and the Nuexco forecast. The Apparent Future Consumption associated with Nuexco's forecast is summarized in Table 6.

Japanese recognition of the slower rate of nuclear power growth, in light of existing commitments to purchase uranium, conversion and enrichment, suggests a more cautious procurement approach in the near to intermediate term. It also suggests the possibility of a harder line in contrast renegotiations, as well as the possibility of secondary market operations.

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Table 4

NUCLEAR DEVELOPMENT[1] IN JAPAN AS OF MARCH 1991

	Number of reactors		Capacity (MWe)	
	Utilities' Plans	**Nuexco Forecast**	**Utilities' Plans**	**Nuexco Forecast**
Operating Reactors	24	24	17,177	17,177
Under Construction	11	11	10,704	10,704
Planned: Approved	7	4	6,183	3,599
Planned: Not Approved	3	2	3,290	2,090
TOTAL	45	41	37,354	33,570

[1] Excludes Fugen ATR and Monju FBR

Table 5

	REACTORS							
	Under Construction		Planned (Authorized)		Planned (Not Authorized)		Yearly Total	
Year of Planned Operation	**Utilities' Plans**	**Nuexco Forecast**	**Utilities' Plans**	**Nuexco Forecast**	**Utilities' Plans**	**Nuexco Forecast**	**Utilities' Plans**	**Nuexco Forecast**
1983	—	—	—	—	—	—	—	—
1984	4	3	—	—	—	—	4	3
1985	3	2	—	—	—	—	3	2
1986	3	2	—	—	—	—	3	2
1987	1	2	—	—	—	—	1	2
1988	—	2	2	—	—	—	2	2
1989	—	—	2	3	1	—	3	3
1990	—	—	3	1	1	2	4	3
1st quarter 1991	—	—	—	—	1	—	1	—
Total	11	11	7	4	3	2	21	17

Table 6

	Millions of Pounds U_3O_8								
Reactors	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**
In Operation (24)	6.2	6.2	6.0	5.9	5.8	5.7	5.5	5.4	5.3
Under Construction (11)	2.5	3.2	4.4	4.7	3.5	3.5	3.4	3.4	3.3
Planned (Approved) (4)	0	0	0	0	2.8	1.6	1.7	1.1	1.4
Planned (Not Approved) (2)	0	0	0	0	0	2.3	0.4	0.6	0.6
TOTAL	8.7	9.4	10.4	10.6	12.1	13.1	11.0	10.5	10.6

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* * *

In **Taiwan**, nuclear power accounted for 30.61 percent (up from 25 percent in 1981) of the 40,899 Gigawatt-hours of electricity generated from nuclear power in 1982. The balance was supplied by oil (48 percent), coal (10 percent) and hydroelectric power (12 percent). Having risen by 1.87 percent, total electricity generation more than offset the 1.32 percent decline experienced in 1981. The availability and capacity factors for Taiwan's operating nuclear units are presented in Table 7.

Table 7

TAIWAN REACTORS' PERFORMANCE IN 1982

Reactor	Availability Factor	Capacity Factor
Chinshan 1	65.15	52.45
Chinshan 2	85.60	80.26
Kuosheng 1	64.80	51.09

UNITED STATES

US activities in the nuclear fuel market are characterized by continued consolidation of the uranium production sector. This was evidenced by the sale of one mill, and the announcements of three production facility closures (Ogle's Bison Basin; Homestake's Pitch; Minerals Exploration's Sweetwater) in the reporting period.

Out of this environment is emerging a small group of aggressive uranium producers who are expanding their uranium holdings or beginning to act as traders in the market. On the other end of the spectrum are those producers who are making plans for withdrawing from the market via the disposition of properties or the closing of production facilities. The result is a bi-modal distribution of producer activities. Very few are pursuing conventional strategies. The last month has seen the virtual disappearance of the US utilities as sellers. Our readers will recall that a few months ago the sellers were dominated by the utility group.

However, now it appears that the majority of US utilities have stablized their inventories at acceptable levels, at least for the short term. So long as interest rates and U_3O_8 prices remain relatively low, most utilities probably will refrain from further selling of inventory. On the other hand, increases in either interest rates or uranium prices could trigger further selling of inventories.

Buyers at this time are focusing on the longer term; the spot and near-term markets (next 12 months) are relatively small. Price competition brought buyers to the spot market in 1982 even though the buyer's needs were longer term. This situation allowed the buyer to purchase in advance of need and hold the material until needed, at an acceptable rate of imputed interest. As the market has risen over the past several months, the price is no longer sufficiently attractive to cause spot or near-term purchasing in advance of need. The result has been a gradual decline in activity in the market for delivery within 12 months. That near-term US demand which does exist has two principal sources:

1. Changing requirements arising from changes in enrichment tails assays;
2. Small quantities sought by producers to satisfy delivery obligations.

* * *

Energy Fuels has sold a majority interest in the Blanding mill to Union Carbide. The operational result will provide the buyer with milling service closer to some of its existing mines. At the same time, the seller, who is concentrating exploration and production in Arizona, may elect to construct milling services closer to its mines and reserves.

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1982 URANIUM PRODUCTION

Nuexco's estimate of 1982 production is presented in Table 8, showing 1982 estimated uranium production for the major producing regions in the Free World as compared with actual 1981 production.

Table 8

WORLD URANIUM PRODUCTION
(millions of pounds U_3O_8)

Country	1981 (Actual)	1982 (Estimated)	Percent Change
Australia	8.1	11.6	+43
Canada	20.0	21.0	+5
France	6.4	7.6	+19
South Africa	15.9	15.1	-5
Other Africa	24.3	23.7	-2
Other	1.2	1.6	+33
Subtotal	75.9	80.6	+6
US	38.7	25.3	-35
TOTAL	114.6	105.9	-8

The 8 percent decline in total worldwide uranium production in 1982 is largely a result of declines in US and African production during the year. During 1982, large inventories were sold on the spot market, resulting in US producers ceasing their higher cost production and becoming buyers, competing for material at spot prices to satisfy their requirements contracts. South African production decreased by 5 percent, primarily due to a uniform production cutback by all of the Chamber of Mines producers. This cutback was caused by the completion of prior contracts and the inability to acquire new ones. Niger and Gabon had substantial cutbacks in production due to the inability on the part of both governments to sell the approximate one-third share that they assume of all material produced.

As Table 8 indicates, increases in production from Australia and France partially offset the decline in US production. Australia's 43 percent increase is a result of ERA's Ranger mine reaching its design operating capacity. The increase in French production is directly attributable to the French desire to build their own inventories. Two facilities, Dong Trieu's Mailhac operation, and SIMO's (Societe Industrielle des Minerais de l'ouest) Lodeve facility reached full production capacities in 1982.

Table 9 presents a comparison of preliminary 1982 estimates with actual US uranium production figures for that year. Actual production from unconventional mining and milling operations fell short of the forecast level by 1.7 million pounds U_3O_8. The substantial decrease shows that by-product and in situ uranium producers are not as well insulated from uncertainties in the industry as we had thought. The total of all operating production centers in the US produced 9.6 percent less than predicted a year ago, a divergence resulting from US producers being more responsive than expected to inventory selling on the spot market.

Table 9

1982 US PRODUCTION
(millions of pounds U_3O_8)

	1982[1] (Forecast)	1982 (Estimated)	Percent Change
Operating Unconventional	7.5	5.8	-23
Operating Conventional	20.5	19.5	-5
TOTAL	28.0	25.3	-10

[1] Nuexco's "Uranium World Market Study and Price Forecast: 1982-1996," March 1982

The regional distribution of US production is shown in Table 10. Those states most affected by the substantial overall decline in US production in 1982 were New Mexico, Wyoming, and Texas. Table 11 presents an alternate perspective on the internal distribution of US production. Those readers desiring further detail may refer to Nuexco Report 173 (January 1983), which contained an extensive summary of the activities of US uranium producers in 1982.

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ANALYSIS & COMMENTARY

Table 10

US URANIUM PRODUCTION BY STATE
(millions of pounds U_3O_8)

Mill Location	1981 (Actual)	1982 (Estimate)	Percent Change
New Mexico	12.3	7.6	-38
Texas	6.3	4.1	-35
Wyoming	8.2	4.8	-41
Utah	6.1	4.2	-31
Others	5.8	4.6	-21
TOTAL	38.7	25.3	-35

Table 11

INDIVIDUAL STATES AS PERCENTAGES OF TOTAL US PRODUCTION

State	Percent of Total 1981 Production	Percent of Total 1982 Production
New Mexico	32	30
Texas	16	16
Wyoming	21	19
Utah	15	17
Others	16	18

Nuexco's forecast for 1983 anticipates the continuation of the decline in worldwide uranium production. As indicated in Table 12, the forecast calls for a 9 percent decrease in which substantial cutbacks in the US, Central Africa and Namibia more than offset modest increases in other regions.

Table 12

WORLD URANIUM PRODUCTION
(millions of pounds U_3O_8)

Country	1982 (Estimated)	1983 (Forecast)
Australia	11.6	11.3
Canada	21.0	21.8
France	7.6	8.0
South Africa	15.1	16.4
Other Africa	23.7	20.8
Other	1.6	2.5
Subtotal	80.6	80.8
US	25.3	15.4
TOTAL	105.9	96.2

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CROW BUTTE URANIUM DEPOSIT

Introduction

The Crow Butte uranium deposit is located in northwest Nebraska near the town of Crawford (Figure 1). The deposit was discovered during the fall of 1980 by the Wyoming Fuel Company, operator of the Crow Butte Joint Venture. The Crow Butte Joint Venture is owned 50 percent by Wyoming Fuel Company, a subsidiary of Kansas-Nebraska Natural Gas Company, Inc., 40 percent by Ferret Exploration Company, Inc. and 10 percent by First Exploration Company, Inc. A preliminary announcement made in January 1981 indicated a "probable potential" reserve in excess of 25,000,000 pounds U_3O_8. Drilling during 1981 and 1982 confirmed these reserves and indicated the presence of more than 30,000,000 pounds U_3O_8 having an average grade in excess of 0.25 percent U_3O_8.

Wyoming Fuel Company was initially attracted to the area in 1978 by favorable regional geology for sandstone uranium deposits and weak radioactivity noted in regional oil and gas holes. Exploration drilling began in 1979 following the formation of the Crow Butte Joint Venture. Drilling has continued up to the present, at which time the Joint Venture is ready to proceed with a pilot scale solution mine. Environmental baseline data have been acquired and the permit applications for the pilot scale mine have been submitted to the Nuclear Regulatory Commission and to the applicable state agencies in Nebraska.

Geographic Setting

The Crow Butte deposit is in the Pine Ridge country of northwest Nebraska. The main portion of the deposit lies north of the Pine Ridge escarpment on gradual sloping terrain with local relief of less than 100 feet. The Pine Ridge escarpment surrounds the main deposit on three sides and is about 500 feet higher in elevation than the northward sloping plain. The Pine Ridge is covered with ponderosa pine and is formed by a major sandstone unit.

The climate, typical of a semi-arid continental climate, is characterized by warm summers, cold winters, light precipitation and frequent changes in the weather. The average precipitation is 15.5 inches distributed mostly during the spring and summer. Average temperature ranges from 23 degrees F in January to 74 degrees F in July, with extremes ranging from -29 degrees F to 110 degrees F.

The land in the area of the deposit is largely privately owned and used for agriculture with a population density of about 12 persons per square mile. Winter wheat and hay are the principal crops and cattle are the principal livestock.

Nearby Crawford is a town of 1315 people whose economy is based on agriculture and tourism. Fort Robinson State Park is located immediately west of the town; other nearby points of interest are the Nebraska National Forest to the southeast and the Black Hills 90 miles to the north. Chadron, with a population of 5933, the largest community in the immediate area, is 25 miles to the east. Scottsbluff, located 75 miles to the south, is the largest community and the principal trade center for northwest Nebraska and eastern Wyoming.

History of Discovery

Wyoming Fuel Company acquired a regional lease position of about 64,000 acres along the Chadron Formation outcrop (Figure 2) of northwest Nebraska in the spring of 1978. The lease position extended from north of Harrison to southeast of Crawford, a distance of about 30 miles.

The lease position was acquired to explore for sandstone uranium mineralization in an area that had received little exploration previously. The position was acquired based on regional oil and gas exploration data. Widely spaced oil and gas exploration holes, 0 to 5 holes per township, indicated an extensive fluvial sandstone system at the base of the Tertiary overlying the Cretaceous Pierre Shale. This fluvial sandstone is the basal sandstone unit of the Chadron Formation of Oligocene age. In the Crawford area it was noted that five oil and gas holes had gamma spikes in the sandstone indicating approximately .005 to .025 percent eU_3O_8. (In this context, eU_3O_8 refers to estimation by means of radiometric measurement.) In addition, methane gas shows had been reported from several oil and gas holes and water wells in the Crawford area. There was also some evidence of oxidation-reduction interfaces based on a lithologic log of one of the oil and gas holes.

Wyoming Fuel Company and Ferret Exploration Company formed a joint venture during the late summer of 1979. Wyoming Fuel Company, designated as project operator, undertook a regional exploration drilling program. Property evaluation began during 1979 and 95 exploration drill holes totaling approximately 50,000 feet were completed. The holes were widely spaced on one or two mile centers. In areas of encouragement, a

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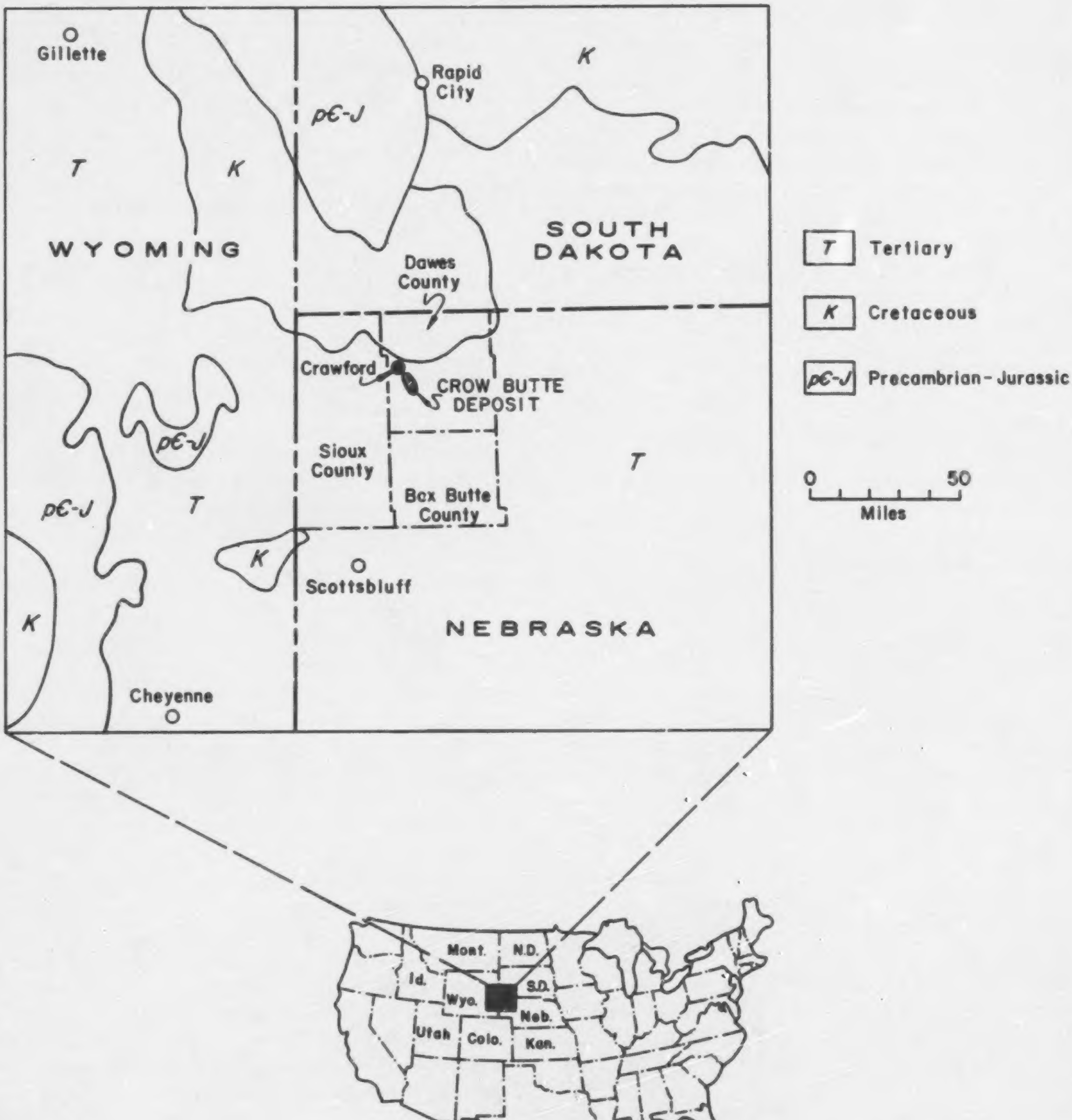
Gillette
Rapid City
K
pЄ-J
T
K
WYOMING
SOUTH DAKOTA
Dawes County
Crawford
CROW BUTTE DEPOSIT
pЄ-J
Sioux County
T
pЄ-J
T
Box Butte County
K
Scottsbluff
K
NEBRASKA
Cheyenne
T Tertiary
K Cretaceous
pЄ-J Precambrian-Jurassic
0
50
Miles
Mont.
N.D.
Id.
S.D.
Wyo.
Neb.
Utah
Colo.
Kan.

Figure 1

CROW BUTTE URANIUM DEPOSIT
Location and Regional Geology

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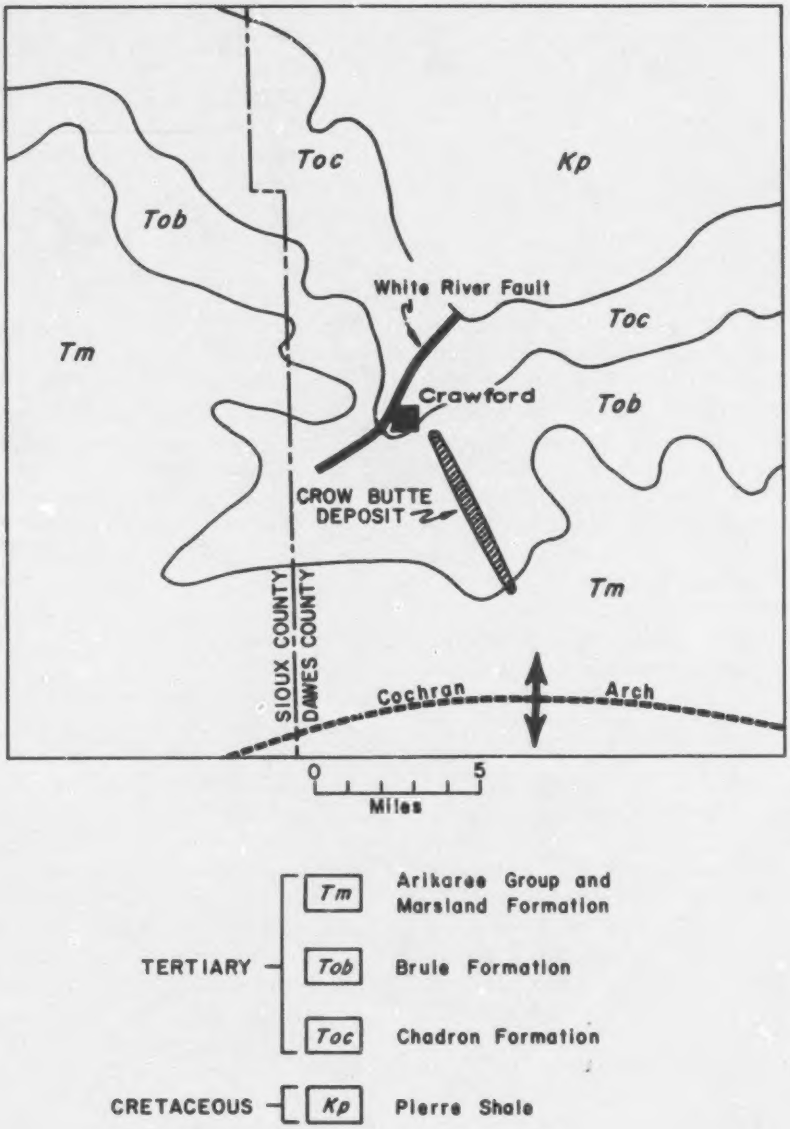
Toc
Kp
Tob
White River Fault
Toc
Tm
Crawford
Tob
CROW BUTTE
DEPOSIT
Tm
SIOUX COUNTY
DAWES COUNTY
Cochran Arch
0
5
Miles
Tm
Arikaree Group and Marsland Formation
TERTIARY
Tob
Brule Formation
Toc
Chadron Formation
CRETACEOUS
Kp
Pierre Shale

Figure 2

CROW BUTTE URANIUM DEPOSIT — NORTHWEST NEBRASKA
Local Geology

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few holes were drilled on a one-fourth to one-half mile spacing. Two areas of encouragement were encountered during this drilling. An area north of Crawford was identified as having considerable weak uranium mineralization associated with vague oxidation-reduction boundaries adjacent to the White River fault. This was in the same general area of weakly radioactive oil and gas holes and methane gas shows.

Following the 1979 drilling, the lease position was consolidated and additional acreage was leased in the area of encouragement. A more extensive drill program was planned for the next phase of project evaluation.

During 1980, reconnaissance drilling continued within the lease block and follow-up drilling continued in areas with encouraging results. The 100th hole of the 1980 drill program intersected the first ore grade mineralization (0.1% eU_3O_8). After an additional 65 holes, a mineralized trend based on three additional holes was indicated to extend about six miles southeast of Crawford.

Following additional lease acquisition, the operator increased the pace of close-spaced drilling. An additional 148 holes were drilled during 1980 to define the mineralized trend which was named Crow Butte (Figure 2) for a prominent butte of the Pine Ridge southeast of Crawford. A total of 408 drill holes had been drilled to date.

At this point, the Crow Butte mineralized trend was determined to be about six miles long and up to 3000 feet wide as defined by a drill hole spacing pattern of 400 feet by 1000 feet in the shallower northern part and 400 feet by 2500 feet along the deeper southern part. Depths to mineralization varied from 275 to 820 feet. Based on 127 holes drilled within the Crow Butte mineralized trend, a news release of January 12, 1981 stated that "probable potential" reserves at the Crow Butte prospect exceeded 25 million pounds U_3O_8.

An additional 850 holes drilled during 1981 further defined the grade, thickness and extent of the Crow Butte mineralized trend. The trend was drilled out on a 200 foot by 200 foot grid. Ore reserves of the Crow Butte Deposit (Figure 2) calculated following the 1981 drilling indicated over 30 million pounds U_3O_8 in place with an average grade in excess of 0.25% eU_3O_8. In addition, chemical analyses of a large number of samples from core holes throughout the deposit indicated that the ratio of chemical uranium to equivalent uranium exceeds 1.20.

Reconnaissance drilling during 1982 doubled the known length of the Crow Butte trend; however, drill hole spacing is too wide to calculate additional reserves. Detailed drilling on a 50 to 100 foot spacing confirmed that the 200 foot grid was adequate for reserve calculations and defined an area for a pilot solution mining operation. Baseline environmental data were also gathered during 1982 for a research and development permit to operate the pilot solution mine. The permit application was submitted during February of 1983.

Geology

Sedimentary strata ranging from Late Cretaceous through Tertiary are exposed throughout the project area (Figure 2). The Pierre Shale of Late Cretaceous age is the oldest formation exposed in the project area. The Pierre Shale is 1200 to 1500 feet thick and outcrops north of Crawford, forming an impermeable zone below the mineralized unit.

Overlying the Pierre Shale is the White River Group of Oligocene age and consists of the Chadron and Brule Formations (Figure 3). The Chadron Formation is the oldest Tertiary formation on record in northwest Nebraska. Comprised of three distinct members, it lies with marked unconformity on the Pierre Shale. The host member of the Crow Butte uranium deposit is the Basal Sandstone, the depositional product of a large vigorous braided stream system. Regionally, the Basal Sandstone thickness ranges from 0 to 350 feet and has an average thickness of 40 to 60 feet in the area of the deposit.

The Middle Chadron Member represents a distinct facies change from the underlying Basal Sandstone. The Middle Chadron is characterized by green and red interbedded clays. The Middle Chadron has a thickness ranging from 40 to 100 feet. The Upper Chadron consists of massive claystones and siltstones ranging in color from a dark blue-green to greenish brown. The Upper Chadron averages 100 feet thick.

The Brule Formation lies conformably on top of the Chadron Formation. It has been subdivided into two separate members, the Orella and Whitney. The Orella is composed of buff to brown siltstones with persistent spotty green nodules as it grades into the green clays of the Chadron. The Whitney Member of the Brule is comprised of fairly massive buff to brown siltstones in part, Eolian in origin. The Brule Formation ranges from 500 to 650 feet in thickness.

The Middle and Upper Chadron Members and Brule Formation form the impermeable zone above the mineralized unit. The upper impermeable zone ranges from 200 to 600 feet in thickness.

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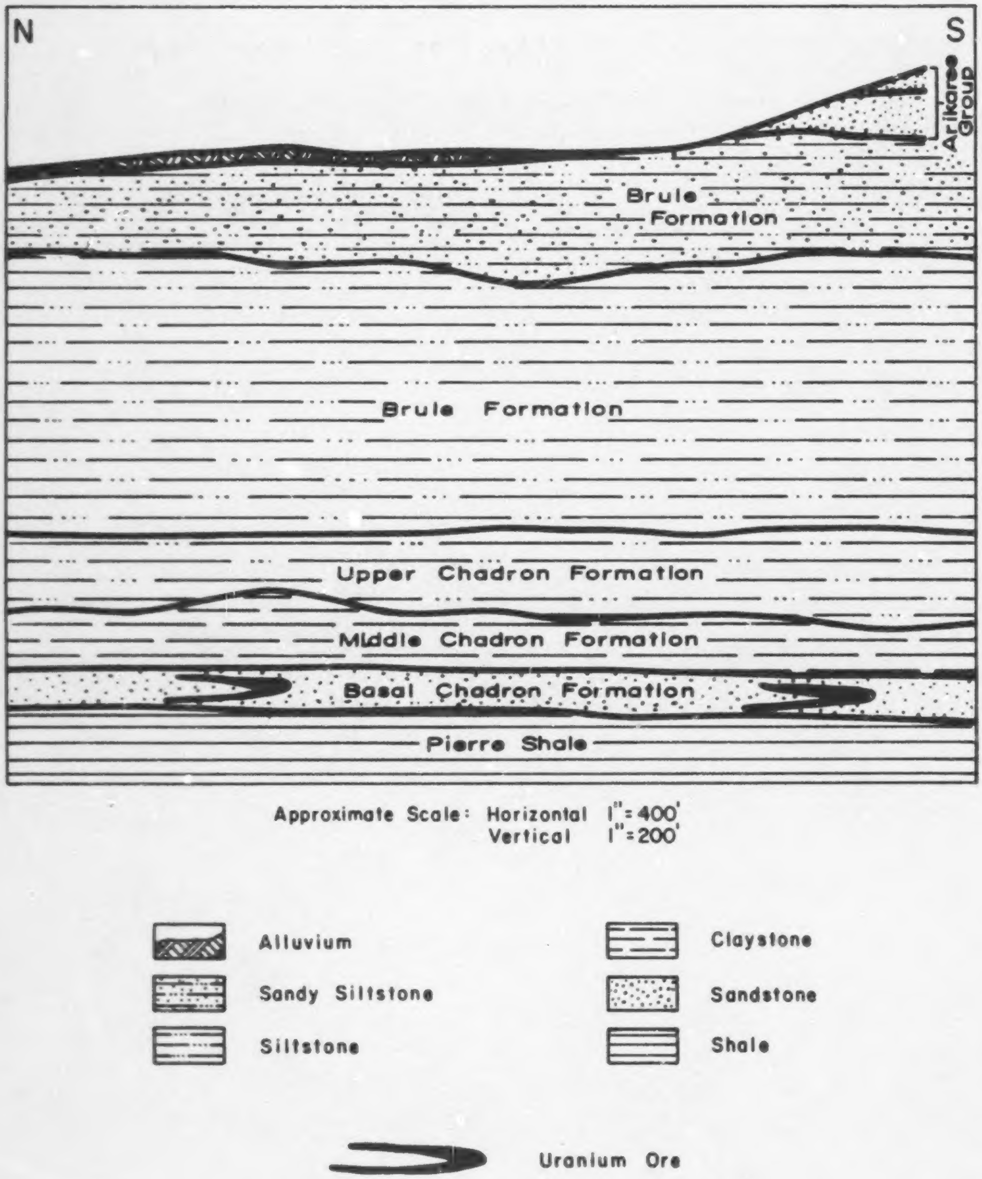
N
S
Arikaree Group
Brule Formation
Brule Formation
Upper Chadron Formation
Middle Chadron Formation
Basal Chadron Formation
Pierre Shale
Approximate Scale: Horizontal 1" = 400'
Vertical 1" = 200'
Alluvium
Sandy Siltstone
Siltstone
Claystone
Sandstone
Shale
Uranium Ore

Figure 3

CROW BUTTE URANIUM DEPOSIT — NORTHWEST NEBRASKA
Generalized Cross Section

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Overlying the White River Group is the Arikaree Group which includes three Miocene Sandstone Formations: the Gering Formation; the Monroe Creek Formation; and the Harrison Formation. The Arikaree Group forms the Pine Ridge which is present south and east of the Crow Butte Deposit.

Structure

The Crow Butte ore deposit lies in what has been named the Crawford Basin. The Crawford Basin lies south of the Black Hills, west of the Chadron Arch, and north of the Cochran Arch. The synclinal axis of the Crawford Basin trends roughly east-west and plunges west into what is informally referred to as the Inner Crawford Basin. The Inner Basin is characterized by the rather sharp paleotopographic change in the Pierre Shale with dramatic increases in the thickness of the Basal Chadron Sandstone. The White River Fault is located directly north of Crawford and strikes northeast and southwest with the upthrown side on the south. The total vertical displacement is 300-400 feet. The displacements of the Chadron and Brule Formations date the fault as post-Oligocene.

Mineralization

The Basal Chadron Sandstone, host for the Crow Butte uranium deposit, is a coarse grained sandstone with frequent interbedded thin clays. The Basal Chadron is an arkosic sandstone with approximately 50 percent monocrystalline quartz, 30-40 percent undifferentiated feldspar, plagioclase feldspar and microcline feldspar. The remainder includes polycrystalline quartz, chert, chalcedonic quartz, various heavy minerals and pyrite. The only uranium mineral identified to date is coffinite, a uranium silicate.

Future Activity

Preliminary engineering and metallurgical studies indicate the Crow Butte uranium deposit is amenable to solution mining techniques. The joint venture has tentative plans to construct and operate a pilot scale solution mine in late 1983 or early 1984 to demonstrate the technical feasibility of in situ mining and restoration of the deposit. The pilot mine will require about one year of operating time, after which the joint venture will determine the next phase in project development.

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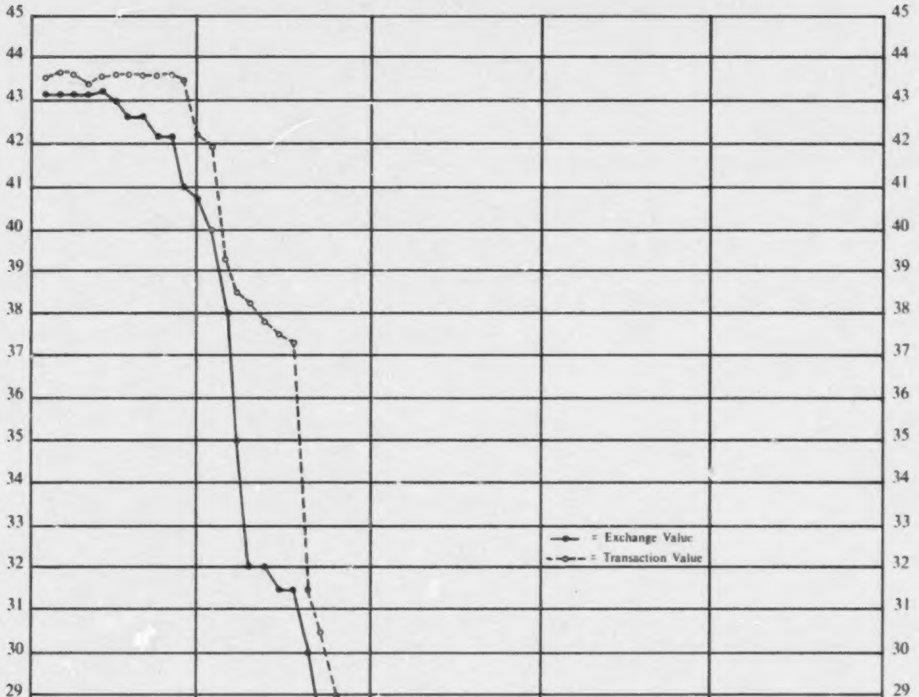
EXCHANGE AND TRANSACTION VALUES
SINCE JANUARY 1979
Determined as of the last day of the month indicated



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HISTORICAL MARKET DATA

HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	**21.75**										

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	**20.00**										

HISTORICAL CONVERSION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	**1.40**										

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AUSTRALIA

	Price Index of Materials Used in Manufacturing Industry—All Groups (Year 1968-69 = 100.0)[1]	Award Rates of Pay Indexes Australia—Adult Males In Mining Wage Earners, Weekly Rates (Year 1976 = 100.0)[2]
Annual Avg. 1971[3]	101.5	65.95
Annual Avg. 1972[3]	105.6	71.26
Annual Avg. 1973[3]	124.4	78.96
Annual Avg. 1974[3]	141.9	108.07
Annual Avg. 1975[3]	150.4	132.55
Annual Avg. 1976[3]	168.4	160.93
Annual Avg. 1977[3]	192.0	179.03
Annual Avg. 1978[3]	198.5	190.04
Annual Avg. 1979	248.8	196.34
Annual Avg. 1980	321.8	218.00
Annual Avg. 1981	355.3	237.34
Sep 1981	358.4	155.0[2]
Oct 1981	352.5	155.6[2]
Nov 1981	351.3	157.5[2]
Dec 1981	349.9	167.4[2]
Jan 1982	354.9	169.0[2]
Feb 1982	356.7	170.6R[2]
Mar 1982	360.3	171.0R[2]
Apr 1982	367.7	170.9R[2]
May 1982	367.6	171.4R[2]
Jun 1982	367.2	172.7R[2]
Jul 1982	369.1	176.5R[2]
Aug 1982	371.5	177.1R[2]
Sep 1982	374.0	177.3R[2]
Oct 1982	377.2P	177.4R[2]
Nov 1982	374.5P	177.5[2]

P = Preliminary R = Revised since last month

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[1] Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0), Table 3.

[2] Australian Bureau of Statistics, Canberra: "Award Rates of Pay Indexes, Australia" (Catalogue No. 6312.0), Table 8. Figures are being converted to an Index number. As the data are converted, the new index numbers will be inserted. Figures for the latest fourteen months shown are subject to revision.

[3] Monthly data for 1970 through 1978 appear on pages 4.7 and 4.8 of Nuexco Report 138.

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GOVERNMENT STATISTICS

CANADA

	Industry Selling Price Index: Manufacturing (D 500000)[1] [2] (1971 = 100.0)	Wage-earner Data: Average Hourly Earnings (C$)[4] [5]		
		Metal Mining, including Milling (SIC 050-099)[3]	Primary Metal Industries, non-ferrous (SIC 296-298)	Chemicals and Chemical Products (SIC 370-379)
Annual Avg. 1978	190.4	8.75R[3]	6.82	6.97
Annual Avg. 1979	217.9	9.66R[3]	7.35	7.67
Annual Avg. 1980	247.2	10.80R[3]	8.05	8.50
Annual Avg. 1981	288.7R	12.23R[3]	9.03	9.53
Nov 1981	278.8	13.01R[3]	9.45	9.89
Dec 1981	280.0	12.96R[3]	9.42	10.03
Jan 1982	281.9	13.49R[3]	9.53	10.11
Feb 1982	283.5	13.61R[3]	9.60	10.19
Mar 1982	284.8	13.74R[3]	9.62	10.35
Apr 1982	287.7	13.81R[3]	9.79	10.48
May 1982	288.8	13.86R[3]	9.88	10.62
Jun 1982	289.7	13.83R[3]	9.92	10.69
Jul 1982	290.3	14.02R[3]	10.05	10.73
Aug 1982	290.2R	14.23R[3]	10.03	10.80
Sep 1982	292.4R	14.01R[3]	10.18	10.73R
Oct 1982	292.1R	13.95R[3]	10.18R	10.83R
Nov 1982	291.3R	14.24P	10.42P	10.90P
Dec 1982	292.2R	—	—	—

P = Preliminary   R = Revised since last month

[1] Statistics Canada, Prices Division, Ottawa; "Industry Price Indexes" (Catalogue 62-011), Table 1. Indexes for the most recent six months shown are subject to revision.

[2] Monthly data for 1973 through 1978 appear on page 4.10 of Nuexco Report 138.

[3] The wage earner series in previous Nuexco reports was Metals (SIC 050-059).

[4] Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa; "Employment, Earnings and Hours" (Catalogue 72-002), Table 2.

[5] Monthly data for 1977 and 1978 appear on page 4.11 of Nuexco Report 138.

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REPUBLIC OF SOUTH AFRICA

	Average Declared Working Costs per Metric Ton of Gold Ore Milled (Rand)[1]	Consumer Price Index[2] (1975 = 100, except where otherwise indicated)	Producer[5] Price Index All Groups (1975 = 100)	Total Employment in Mining and Quarrying (Code 35)[7]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand) (Code 40)[7]
Annual Avg. 1971[3]	7.88	106.4[4]	59.1	652,294	415,956
Annual Avg. 1972[3]	8.79	113.3[4]	63.9	623,067	443,933
Annual Avg. 1973[3]	10.51	124.1[4]	72.3	684,743	572,133
Annual Avg. 1974[3]	13.18	138.5[4]	85.3	674,140	761,596
Annual Avg. 1975[3]	16.71	157.2[4]	100.0	639,473	1,003,617
Annual Avg. 1976[3]	19.30	174.7[4]	115.1	671,240	1,212,983
Annual Avg. 1977[3] [6]	23.87	194.4[4]	130.0	712,006	1,420,670
Annual Avg. 1978[3] [6]	27.14	137.2	142.7	664,571	1,537,169
Annual Avg. 1979[3] [6]	30.18	155.3	164.5	692,209	1,830,632
Annual Avg. 1980[6]	35.53	176.7	192.1	714,379	2,279,615
Annual Avg. 1981	41.89	206.5	218.3	728,506	2,820,505
Aug 1981	—	208.0	222.6	722,684	245,817
Sep 1981	43.28	211.6	224.6	724,604	251,502
Oct 1981	—	213.4	227.0	717,918	248,159
Nov 1981	—	214.8	229.4	720,255	253,044
Dec 1981	44.52	216.3	230.4	709,612	257,655
Jan 1982	—	217.6	233.1	700,375	257,173
Feb 1982	—	220.2	236.8	705,992	250,191
Mar 1982	45.49	225.2	237.4	725,700	262,210
Apr 1982	—	228.9	241.9	707,502	252,562
May 1982	—	230.3	244.8	715,162	258,770
Jun 1982	45.77	232.1	246.7	707,552	261,361
Jul 1982	—	234.1	249.4	702,141	283,248
Aug 1982	—	236.8	253.4	705,562	276,730
Sep 1982	48.04	241.0	255.0	704,490	281,331
Oct 1982	—	243.9	260.1	—	—
Nov 1982	—	245.4	262.5	—	—
Dec 1982	49.62	246.2	263.0	—	—
Jan 1983	—	249.0	—	—	—

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[1] Chamber of Mines of South Africa, Johannesburg; "Analysis of Working Results," published quarterly.

[2] Republic of South Africa Department of Statistics, Pretoria; "Government Gazette: Consumer Price Index for Urban Areas."

[3] Historical data for the Average Declared Working Costs and Consumer Price Index 1970-1979 appear on page 4.9 of Nuexco Report 140.

[4] April 1970 = 100.00.

[5] Previously known as the WHOLESALE PRICE INDEX, now the PRODUCER PRICE INDEX. The computation remains the same.

[6] Historical data for Codes 35 and 40 1977-1980 appear on page 28 of Nuexco Report 157.

[7] Bulletin of Statistics, Department of Statistics, Pretoria.

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GOVERNMENT STATISTICS

UNITED STATES

	Producer Price Index— Industrial Commodities (1967 = 100)[1]	Producer Price Index— All Commodities (1967 = 100)[1]	Consumer Price Index (1967 = 100)[2]	GNP Implicit Price Deflator (1972 = 100)[3]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[4]			
					Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
Annual Avg. 1972[5]	117.9	119.1	125.3	100.00	4.56	4.59	4.26	3.71
Annual Avg. 1973[5]	125.9	134.7	133.1	105.75	4.84	4.98	4.51	3.91
Annual Avg. 1974[5]	153.8	160.1	147.7	115.08	5.44	5.63	4.88	4.21
Annual Avg. 1975[5]	171.5	174.9	161.2	125.79	6.13	6.24	5.39	4.64
Annual Avg. 1976[5]	182.4	183.0	170.5	132.34	6.76	6.87	5.91	4.96
Annual Avg. 1977[5]	195.1	194.2	181.5	140.05	7.28	7.67	6.43	5.39
Annual Avg. 1978[5]	209.4	209.3	195.4	150.42	8.23	8.56	7.02	5.82
Annual Avg. 1979[5]	236.5	235.6	217.4	163.42	9.27	9.50	7.60	6.32
Annual Avg. 1980[5]	274.8	268.8	246.8	178.64	10.26	10.63	8.30	6.94
Annual Avg. 1981	304.1	293.4	272.4	195.51	11.55	11.98	9.12	7.62
Annual Avg. 1982	312.3P	299.3P	289.1	207.15R	—	—	9.98P	8.17P
Jan 1982	311.7	298.2	282.5	—	12.19	12.66	9.68	7.98
Feb 1982	311.4	298.5	283.4	—	12.22	12.61	9.68	7.96
Mar 1982	311.0	298.0	283.1	203.68	12.29	12.69	9.71	8.01
Apr 1982	309.9	298.0	284.3	—	12.23	12.68	9.81	8.03
May 1982	309.6	298.6	287.1	—	12.25	12.71	9.83	8.05
Jun 1982	310.6	299.3	290.6	205.98	12.26	12.91	9.95	8.09
Jul 1982	312.8	300.4	292.2	—	12.23	12.91	10.02	8.18
Aug 1982	313.2	300.2	292.8	—	12.29	12.97	10.03	8.24
Sep 1982	312.7R	299.3R	293.3	208.51	12.53	13.46	10.20	8.31
Oct 1982	314.4P	299.9P	294.1	—	12.50	13.22	10.24	8.34
Nov 1982	315.1P	300.4P	293.6	—	12.52R	13.18R	10.28R	8.38
Dec 1982	315.0P	300.6P	292.4	210.42R	12.51R	13.04P	10.34R	8.47R
Jan 1983	314.0P	300.0P	293.1	—	—	—	10.35P	8.47P

P = Preliminary   R = Revised since last month

[1] US Bureau of Labor Statistics, Washington, D.C.; "Producer Prices and Price Indexes," Table 6 (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents.

[2] US Bureau of Labor Statistics, Washington, D.C.; Consumer Price Index for All Urban Consumers, US City Average, All Items.

[3] US Department of Commerce, Washington, D.C.; Bureau of Economic Analysis, National Income and Wealth Division; "Survey of Current Business," Table A. The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted.

[4] US Bureau of Labor Statistics, Washington, D.C.; "Employment and Earnings," Table C-2. All data based on 1972 revision of SIC Manual. Data for 1970-1976 are adjusted to the March 1977 benchmark. Data for 1977-1978 are adjusted to the March 1979 benchmark. Data for January 1979 and beyond are adjusted to the March 1980 benchmark.

[5] Monthly data 1970-1978 for Producer Price Index-Industrial Commodities, Consumer Price Index, and Employment and Earnings SIC codes 10, 333, and 28, and quarterly data for GNP Implicit Price Deflator appear on pages 4.6-4.8 of Nuexco Report 139.
Monthly data 1977-1978 for Employment and Earnings SIC Codes 10, 333, and 28 appear on page 33 of Nuexco Report 147.
Monthly data 1970-1978 for Employment and Earnings SIC Code 36 appear on page 23 of Nuexco Report 154.
Monthly data 1979-1980 for Employment and Earnings, Revised Establishment Data, all listed codes, appear on page 22 of Nuexco Report 158.
Monthly data 1977-1980 for Producer Price Index-All Commodities, appear on page 21 of Nuexco Report 158.

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Table 13A

COST OF ENRICHED URANIUM (US $ per KgU as UF_6, 3 percent U_{235}) FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS (0.20% TA)

Feed Cost (US $ per KgU as Natural UF_6)	SWU Price (US $ per SWU)								
	90	95	100	105	110	115	120	125	130
40	606.75	628.29	649.82	671.35	692.88	714.42	735.95	757.48	779.01
45	634.15	655.68	677.22	698.75	720.28	741.81	763.35	784.88	806.41
50	661.55	683.08	704.61	726.15	747.68	769.21	790.74	812.28	833.81
55	688.95	710.48	732.01	753.54	775.08	796.61	818.14	839.67	861.20
60	716.34	737.88	759.41	780.94	802.47	824.01	845.54	867.07	888.60
65	743.74	765.27	786.81	808.34	829.87	851.40	872.93	894.47	916.00
70	771.14	792.67	814.20	835.73	857.27	878.80	900.33	921.86	943.40
75	798.53	820.07	841.60	863.13	884.66	906.20	927.73	949.26	970.79
80	825.93	847.46	869.00	890.53	912.06	933.59	955.13	976.66	998.19
85	853.33	874.86	896.39	917.93	939.46	960.99	982.52	1,004.06	1,025.59
90	880.73	902.26	923.79	945.32	966.86	988.39	1,009.92	1,031.45	1,052.99
95	908.12	929.66	951.19	972.72	994.25	1,015.79	1,037.32	1,058.85	1,080.38
100	935.52	957.05	978.59	1,000.12	1,021.65	1,043.18	1,064.72	1,086.25	1,107.78
	90	95	100	105	110	115	120	125	130
105	962.92	984.45	1,005.98	1,027.52	1,049.05	1,070.58	1,092.11	1,113.65	1,135.18
110	990.32	1,011.85	1,033.38	1,054.91	1,076.45	1,097.98	1,119.51	1,141.04	1,162.57
115	1,017.71	1,039.25	1,060.78	1,082.31	1,103.84	1,125.37	1,146.91	1,168.44	1,189.97
120	1,045.11	1,066.64	1,088.18	1,109.71	1,131.24	1,152.77	1,174.30	1,195.84	1,217.37
125	1,072.51	1,094.04	1,115.57	1,137.10	1,158.64	1,180.17	1,201.70	1,223.23	1,244.77
130	1,099.90	1,121.44	1,142.97	1,164.50	1,186.03	1,207.57	1,229.10	1,250.63	1,272.16
135	1,127.30	1,148.83	1,170.37	1,191.90	1,213.43	1,234.96	1,256.50	1,278.03	1,299.56
140	1,154.70	1,176.23	1,197.76	1,219.30	1,240.83	1,262.36	1,283.89	1,305.43	1,326.96
145	1,182.10	1,203.63	1,225.16	1,246.69	1,268.23	1,289.76	1,311.29	1,332.82	1,354.36
150	1,209.49	1,231.03	1,252.56	1,274.09	1,295.62	1,317.16	1,338.69	1,360.22	1,381.75
155	1,236.89	1,258.42	1,279.96	1,301.49	1,323.02	1,344.55	1,366.09	1,387.62	1,409.15
160	1,264.29	1,285.82	1,307.35	1,328.89	1,350.42	1,371.95	1,393.48	1,415.02	1,436.55

OPTIMUM TAILS ASSAY FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS

(percent U_{235})

Feed Cost (US$ per KgU as Natural UF_6)	SWU Price (US $ per SWU)																
	90	95	100	105	110	115	120	125	130	138.65	140	149.85	160	170	180	190	200
40	.316	.322	.327	.333	.338	.343	.347	.352	.356	.363	.364	.372	.379	.385	.391	.397	.402
45	.302	.308	.314	.320	.325	.330	.334	.339	.343	.350	.351	.359	.366	.373	.379	.384	.390
50	.291	.297	.302	.308	.313	.318	.323	.327	.332	.339	.340	.347	.354	.361	.367	.373	.379
55	.280	.286	.292	.297	.302	.307	.312	.317	.321	.328	.329	.337	.344	.351	.357	.363	.368
60	.271	.277	.282	.288	.293	.298	.302	.307	.311	.319	.320	.327	.334	.341	.347	.353	.359
65	.262	.268	.273	.279	.284	.289	.294	.298	.302	.310	.311	.318	.326	.332	.339	.345	.350
70	.254	.260	.265	.271	.276	.281	.285	.290	.294	.301	.302	.310	.317	.324	.330	.336	.342
75	.246	.252	.258	.263	.268	.273	.278	.282	.287	.294	.295	.302	.310	.316	.323	.329	.334
80	.239	.245	.251	.256	.261	.266	.271	.275	.279	.287	.288	.295	.302	.309	.316	.322	.327
85	.233	.239	.244	.249	.254	.259	.264	.268	.273	.280	.281	.288	.296	.302	.309	.315	.321
90	.227	.232	.238	.243	.248	.253	.258	.262	.266	.274	.275	.282	.289	.296	.302	.308	.314
95	.221	.227	.232	.237	.242	.247	.252	.256	.260	.268	.269	.276	.283	.290	.296	.302	.308
100	.216	.221	.227	.232	.237	.242	.246	.251	.255	.262	.263	.270	.278	.284	.291	.297	.302

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Table 13B

COST OF ENRICHED URANIUM (US $ per KgU as UF$_6$, 3 percent U$_{235}$) FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS (0.20% TA)

Feed Cost (US $ per KgU as Natural UF$_6$)	SWU Price (US $ per SWU)							
	138.65	140	149.85	160	170	180	190	200
40	816.26	822.08	864.50	908.21	951.27	994.34	1,037.40	1,080.47
45	843.66	849.48	891.89	935.60	978.67	1,021.73	1,064.80	1,107.86
50	871.06	876.87	919.29	963.00	1,006.07	1,049.13	1,092.20	1,135.26
55	898.46	904.27	946.69	990.40	1,033.46	1,076.53	1,119.59	1,162.66
60	925.85	931.67	974.09	1,017.80	1,060.86	1,103.93	1,146.99	1,190.06
65	953.25	959.06	1,001.48	1,045.19	1,088.26	1,131.32	1,174.39	1,217.45
70	980.65	986.46	1,028.88	1,072.59	1,115.66	1,158.72	1,201.79	1,244.85
75	1,008.84	1,013.86	1,056.28	1,099.99	1,143.05	1,186.12	1,229.18	1,272.25
80	1,035.44	1,041.26	1,083.67	1,127.39	1,170.45	1,213.51	1,256.58	1,299.64
85	1,062.84	1,068.65	1,111.07	1,154.78	1,197.85	1,240.91	1,283.98	1,327.04
90	1,090.24	1,096.05	1,138.47	1,182.18	1,225.24	1,268.31	1,311.37	1,354.44
95	1,117.63	1,123.45	1,165.87	1,209.58	1,252.64	1,295.71	1,338.77	1,381.84
100	1,145.03	1,150.85	1,193.26	1,236.97	1,280.04	1,323.10	1,366.17	1,409.23
	138.65	140	149.85	160	170	180	190	200
105	1,172.43	1,178.24	1,220.66	1,264.37	1,307.44	1,350.50	1,393.57	1,436.63
110	1,199.83	1,205.64	1,248.06	1,291.77	1,334.83	1,377.90	1,420.96	1,464.03
115	1,227.22	1,233.04	1,275.46	1,319.17	1,362.23	1,405.30	1,448.36	1,491.43
120	1,254.62	1,260.43	1,302.85	1,346.56	1,389.63	1,432.69	1,475.76	1,518.82
125	1,282.02	1,287.83	1,330.25	1,373.96	1,417.03	1,460.09	1,503.16	1,546.22
130	1,309.41	1,315.23	1,357.65	1,401.36	1,444.42	1,487.49	1,530.55	1,573.62
135	1,336.81	1,342.63	1,385.04	1,428.76	1,471.82	1,514.88	1,557.95	1,601.01
140	1,364.21	1,370.02	1,412.44	1,456.15	1,499.22	1,542.28	1,585.35	1,628.41
145	1,391.61	1,397.42	1,439.84	1,483.55	1,526.61	1,569.68	1,612.74	1,655.81
150	1,419.00	1,424.82	1,467.24	1,510.95	1,554.01	1,597.08	1,640.14	1,683.21
155	1,446.40	1,452.21	1,494.63	1,538.34	1,581.41	1,624.47	1,667.54	1,710.60
160	1,473.80	1,479.61	1,522.03	1,565.74	1,608.81	1,651.87	1,694.94	1,738.00

OPTIMUM TAILS ASSAY FOR VARIOUS COMBINATIONS OF FEED AND SWU COSTS

(percent U$_{235}$)

Feed Cost (US$ per KgU as Natural UF$_6$)	SWU Price (US $ per SWU)																
	90	95	100	105	110	115	120	125	130	138.65	140	149.85	160	170	180	190	200
105	.211	.216	.222	.227	.232	.236	.241	.245	.250	.257	.258	.265	.272	.279	.285	.291	.297
110	.206	.211	.217	.222	.227	.231	.236	.240	.245	.252	.253	.260	.267	.274	.280	.286	.292
115	.201	.207	.212	.217	.222	.227	.231	.236	.240	.247	.248	.255	.262	.269	.275	.281	.287
120	.197	.202	.208	.213	.218	.222	.227	.231	.235	.242	.243	.250	.258	.264	.271	.277	.282
125	.193	.198	.204	.209	.213	.218	.222	.227	.231	.238	.239	.246	.253	.260	.266	.272	.278
130	.189	.194	.200	.205	.209	.214	.218	.223	.227	.234	.235	.242	.249	.256	.262	.268	.273
135	.185	.191	.196	.201	.205	.210	.214	.219	.223	.230	.231	.238	.245	.251	.258	.264	.269
140	.182	.187	.192	.197	.202	.206	.211	.215	.219	.226	.227	.234	.241	.247	.254	.260	.265
145	.178	.184	.189	.194	.198	.203	.207	.211	.215	.222	.223	.230	.237	.244	.250	.256	.261
150	.175	.180	.185	.190	.195	.199	.204	.208	.212	.218	.219	.227	.234	.240	.246	.252	.258
155	.172	.177	.182	.187	.192	.196	.200	.204	.208	.215	.216	.223	.230	.237	.243	.248	.254
160	.169	.174	.179	.184	.188	.193	.197	.201	.205	.212	.213	.220	.227	.233	.239	.245	.251

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APRIL 1983 NUMBER 176

Monthly Report on the Nuclear Fuel Market

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NUEXCO

EXECUTIVE SUMMARY
REPORT 176

Exchange Value Rose $0.50, to $22.25	The **Exchange Value** as of March 31, 1983 is **$22.25** per pound U_3O_8. Six spot or near-term sales are reported, involving approximately 1.1 million pounds U_3O_8, *equivalent*.
Near-term Supply-Demand Ratio Dropped to 2.6:1	Active spot and near-term **uranium supply** amounts to **7.5 million** pounds U_3O_8, *equivalent*, down 13% from last month. **Active** spot and near-term **uranium demand** increased slightly to **2.9 million** pounds U_3O_8 equivalent. Therefore, the spot and near-term **supply-demand ratio** declined 16 percent, to **2.6:1**.
Transaction Value Rose $1.35, to $21.35	The **Transaction Value** as of March 31, 1983 is **$21.35** per pound U_3O_8. It includes 12 transactions involving a total of 2.8 million pounds U_3O_8 and covers a period of three months.
Conversion Value Unchanged at $1.40	The **Conversion Value** as of March 31, 1983 is **$1.40** per pound U as UF_6, unchanged since last month. One small conversion transaction is reported. Active sellers are offering 3.0 million pounds U in near-term conversion services, up 15% since last month. Active demand declined 20%, to 735 thousands pounds U.
Loan Use Charge Rate Steady at 6%	The **Loan Use Charge Rate** as of March 31, 1983 is **6 percent** per annum. No loan transactions are reported. This segment of the market remains quiet.
SWU Values: **FY 83 $106, up $3** **FY 84 $110, unchanged**	As of March 31, 1983, the **SWU Value for FY83** is **$106 per SWU** and the **SWU Value for FY84** is **$110**. Those prices reflect some price hardening by sellers of large quantities of Eurodif SWUs, in response to a decrease in competing DOE supply. Prices offered by those few sellers of DOE SWU remaining in the market are approximately $120 per SWU. The only potential buyers for sizable blocks of FY83 SWU on the secondary market are holders of DOE requirements contracts having 3.5-year termination provisions. However, there are very few who would be willing to terminate at this late date in order to enter the secondary market. For FY84 SWUs, there is no large differential between prices being offered by sellers of DOE and Eurodif SWUs. This segment of the market is the most active at present. The market for FY85 and beyond remains quiet, awaiting DOE's revelation of the terms and conditions of conversion to the FR contract.
Africa	Summarizes **Niger's** 1982 uranium sales. Presents excerpts from uranium market comments by senior mining house officials in **South Africa**.
Australia	Discusses implications of Labor Party's election victory.
Japan	Annual price negotiations with African suppliers yield prices of approximately $33.50-34.50 for 1984.
United States	Presents edited remarks of Nuexco President George White, Jr. at AIF Fuel Cycle meeting in Kansas City.
Raw Materials	Updates exploration in the Arizona Strip, with emphasis on breccia pipes.

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NUEXCO REPORT 176
FIGURES OF THE MONTH
(March 31, 1983)

	This Month (Report 176)	Last Month (Report 175)	12 Months Ago (Report 164)
Exchange Value[1]	22.25	21.75	22.50
Transaction Value[1]	21.35	20.00	23.40
Conversion Value[2]	1.40	1.40	1.20
Loan Use Charge Rate[3]	6%	6%	6%
Near-Term Uranium Supply[4]	7.5	8.6	11.2
Near-Term Uranium Demand[5]	2.9	2.8	2.2
Near-Term Supply-Demand Ratio	2.6	3.1	5.2
Current Transactions[6]:			
Number of Transactions	7	5	6
Quantity of Material[7]	6.7-7.4+	0.8-1.8	0.6-1.4
SWU Prices[8]:			
Nuexco SWU Values:			
FY 83	106	103	—
FY 84	110	110	—
USDOE SWU Prices:			
AFC	138.65	138.65	130.75
Requirements	149.85	149.85	138.37
Market Value of Enriched UF_6[9] [10]:			
2.5 w/o U_{235}	616.48	600.94	—
3.0 w/o U_{235}	790.32	770.28	—
3.5 w/o U_{235}	967.34	942.70	—
4.0 w/o U_{235}	1,146.70	1,117.40	—

---

[1] US \$ per pound U_3O_8 equivalent

[2] US \$ per pound U as UF_6

[3] Per annum

[4] Active inquiries to sell, for delivery within 12 months after contract signing (millions of pounds U_3O_8)

[5] Active inquiries to purchase, for delivery within 12 months after contract signing (millions of pounds U_3O_8)

[6] Uranium transactions only; does not include loans, conversion, or SWU transactions

[7] Millions of pounds U_3O_8, equivalent

[8] US \$ per SWU

[9] Calculated using the Nuexco Exchange Value, Conversion Value, and 0.20 percent tails assay. Calculations before 2/28/83 used the USDOE price for AFC SWUs. As of 2/28/83, calculations use the Nuexco SWU Value for the relevant fiscal year (currently FY 83).

[10] US \$ per KgU as UF_6

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MONTHLY REPORT ON THE URANIUM MARKET

April 1983 No. 176

R. WESLEY MILLER, *EDITOR*

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FOREWORD

It is with regret that we announce the resignation of Sanford C. Anderson from Nuexco. Sandy will be pursuing a new career outside the nuclear field, but will remain associated with Nuexco as a special consultant. Having been associated with us for ten years, he will be missed by friends, colleagues and customers. We all wish him well.

NATURAL URANIUM AND CONVERSION

The **Exchange Value** as of March 31, 1983 rose for the sixth consecutive month, to **$22.25** per pound U_3O_8, up $0.50 since last month. Market activity during March was spread over a wide range between $21.50 and $23.75 per pound U_3O_8.

The *Current Market Data* section lists seven uranium sales transactions, amounting to more than 20 million pounds U_3O_8, equivalent. The six spot or near-term transactions accounted for approximately 1.1 million pounds of the total.

Active spot and near-term uranium supply (material offered at competitive prices, terms, and other conditions) amounts to **7.5** million pounds U_3O_8 equivalent, down 13 percent from last month's level of 8.6 million. **Active spot and near-term uranium demand** increased slightly to **2.9** million pounds U_3O_8, equivalent. The spot and near-term **supply-demand ratio** declined to **2.6:1**, 16 percent lower than last month's level of 3.1.

* * *

The **Transaction Value** as of March 31, 1983 is **$21.35** per pound U_3O_8, equivalent. The increase of $1.35 is attributable to the fact that transactions from December 1982 are no longer included in the sample. That month's transactions included a large quantity of material sold at prices substantially lower than the current Exchange Value or Transaction Value. The current Transaction Value includes 12 transactions involving a total of 2.8 million pounds U_3O_8 equivalent, and covers a period of three months.

* * *

The **Conversion Value** as of March 31, 1983 is **$1.40** per pound U as UF_6, unchanged from last month. **Spot and near-term conversion supply** (active inquiries to sell conversion services within one year) total **3.0 million** pounds U, up 15 percent since last month. **Spot and near-term conversion demand** declined by approximately 20 percent, to **735 thousand** pounds U. The *Current Market Data* section lists one conversion transaction this month, for 100-300 thousand pounds U.

* * *

The **Loan Use Charge Rate** remained at six percent per annum. Several million pounds U_3O_8 are available for loan at or near the current level, but there are few potential borrowers. No loan transations are reported this month.

* * *

With its sixth consecutive monthly increase, the **Exchange Value** has rebounded to $22.25 per pound U_3O_8, approximately one-third higher than the recent low of $17.00 which occurred last year as of August 31 and September 30. However, to expect a sustained price rise would be to ignore the economic factors that ultimately drive the market. Buyers and sellers alike seem to share the perception that the fundamentals of supply and demand argue against a sustained price rise. Nevertheless, the market is characterized by behavior that *appears* to refute that perception. Buyers and sellers act as though they believe spot and near-term market prices will continue increasing for some indefinite period of time. The following examples serve to illustrate the *apparently* contradictory behavior which characterizes the current market.

1. Buyers are entering the market, primarily for intermediate- and long-term supplies.
2. In many cases, the movements into and out of the market by potential buyers and sellers seem to be driven more by their perceptions of the prevailing "market psychology" than by market fundamentals, financial considerations, or (in the case of buyers) by their actual need for uranium.
3. While spot and near-term transactions in March amounted to 1.1 million pounds U_3O_8, additions to demand more than offset additions to supply, such that the near-term supply-demand ratio declined by approximately one-sixth from the previous month.
4. There are a number of producers holding substantial inventories off the market, presumably in the expectation of obtaining higher prices later.
5. Those sellers who are active have been moving their offering prices higher from month to month, and even from offer to offer.
6. Buyers having need of spot or near-term supplies seem to be adopting more flexible negotiating postures, especially with regard to price, apparently in expectation of higher prices in the near future.
7. Believing that spot and near-term market prices will continue to rise for some time, some buyers have entered the market well in advance of need, hoping to obtain material at prices that will look very attractive later.

A word of caution is in order. The outlook for all uranium prices is more uncertain than it might seem. The recent, modest recovery of spot and near-term prices

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could stop as suddenly as it began. If producers continue to shut down, cut back and postpone additions to capacity, a perceived shortage of production capacity could develop in the middle of this decade sufficient to stimulate substantial increases in prices for long-term contracts. On the other hand, holders of large quantities of inventory could sell or consume their excess, imposing strong downward pressure on the longer-term market as well as on the spot and near-term markets.

History has shown that the uranium market, having few participants and few transactions, is subject to large price swings. To the extent that a consensus develops with regard to future price behavior, those expectations can be self-fulfilling. In that event, the uranium price cycle would likely pass through higher peaks and lower valleys than would otherwise have occurred, both for spot/near-term prices and for longer-term prices. So long as uranium prices can be affected so strongly by any one of numerous conflicting influences, the possibility of extreme movements in either direction shrouds the future in uncertainty.

ENRICHED URANIUM AND SWUs

As of March 31, 1983 the **SWU Value for FY 1983** is **$106 per SWU**, up $3 from a month ago. This price rise reflects some price hardening by sellers of large quantities of Eurodif SWU in response to a decrease in competing DOE market supply. In recent months, in order to be competitive, Eurodif sellers have had to offer substantial discounts below the prices offered by DOE secondary market sellers. There are now, however, virtually no DOE secondary market SWU available for FY 1983 at competitive prices, so Eurodif sellers have been raising their offering prices and hardening their negotiating postures somewhat.

The potential market for sizable blocks of SWU for FY 1983 delivery is still comprised of those DOE customers holding requirements contracts having 3.5-year termination provisions. Among that group, there are very few, if any, having FY 1983 deliveries who would be willing to terminate at this late date and buy replacement SWU on the secondary market. DOE's standard policy requires 6 months' notice for the specification of enrichment assays and quantities to be delivered, so most such buyers who were willing to use the secondary market have already terminated and purchased replacement SWU before the six-month deadline. It is highly unlikely that many new such buyers will enter the market at this late stage.

The few sellers of DOE SWU for FY 1983 delivery are presently offering at approximately $120 per SWU (at 0.20 percent tails assay). They are primarily holders of enriched product inventory wishing to sell SWU by means of de-enrichment swaps. There is little interest at present for buyers in completing transactions at this price level. However, there are some potential buyers of FY 1983 SWUs seeking small quantities in excess of their requirements contract appendix A ceilings or due to unexpected changes in their fuel needs. Such buyers will likely have to pay prices substantially above $106, the current SWU Value for FY 1983, if such purchases are made from DOE customers.

As of March 31, 1983 the **SWU Value for FY 1984 is $110 per SWU**, unchanged since last month. The price reflects SWU prices available for delivery in FY 1984 from both Eurodif and DOE SWU sellers. This segment of the secondary SWU market is very active. Demand increased substantially for FY 1984 this month as a number of buyers holding DOE requirements contracts having 3.5-year termination provisions began seeking secondary market supply to replace deliveries scheduled for mid-to-late FY 1984. These buyers hope to complete secondary market SWU purchases in time to allow them to terminate their FY 1984 requirements contract deliveries with more than one year's notice. It appears probable that most DOE FY 1984 SWUs now available on the secondary market at competitive prices will be sold within the next few months. In that event, the remaining DOE 3.5-year requirements contract holders who wish to terminate in FY 1984 could face the same choice that many faced in FY 1983, that of whether to accept full-priced supply from DOE or to purchase discounted SWU produced by another enricher.

The market for FY 1985 and later remains quiet, as it has for the past several months. Potential sellers await DOE's announcement of the terms and conditions of conversion to the FR (Facility Requirements) contract. That announcement is expected in late April or early May.

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CURRENT MARKET DATA

EXCHANGE VALUE \$22.25/lb. U_3O_8
Determined as of March 31, 1983

Definition[1]

The Exchange Value is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the last day of the month.

Derivation

Nuexco bases the Exchange Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Exchange Value:

A. The price of uranium delivered or to be delivered under old contracts.
B. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.

[1] In December, 1981, Nuexco published a history of the Exchange Value which chronicled, month-by-month, changes in its definition, usage and derivation. Copies are available upon request.

TRANSACTION VALUE[2]
Determined as of March 31, 1983

\$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
21.35	2.8	12	3

Definition

The Transaction Value is a weighted average price of recent transactions, and is based on prices paid for U_3O_8 in transactions closed within the previous three-month period and for which delivery was scheduled within one year of the transaction date. At least ten transactions totaling at least two million pounds U_3O_8 are included in each calculation, or the sample time is extended as necessary to include these minima. Foreign currencies are converted to US dollars as of the transaction date.

Comments

Nuexco does not consider the following in determining the Transaction Value:

A. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.
B. The price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of Exchange Value or any other independent variable. Also excluded from consideration are all data where the delivery price is defined in such a way that it cannot currently be determined.

[2] Transaction Values for 1976 through 1981 and their associated parameters (millions of pounds, number of transactions and number of months) are tabulated on pages 31 and 32 of Report 161. Corresponding data for 1982 are tabulated on page 5 of Report 173.

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CURRENT MARKET DATA

CONVERSION VALUE[1] $1.40/lb. U as UF_6
Determined as of March 31, 1983

Definition

The Conversion Value is Nuexco's judgment of the price at which spot and/or near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the last day of the month.

Derivation

Nuexco bases the Conversion Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Conversion Value:

A. The price of conversion services delivered or to be delivered under old contracts.
B. The price of conversion services delivered in connection with contract renegotiations or other than arm's length transactions.

[1] Monthly data for 1981 and 1982 are tabulated on page 6 of Report 173.

LOAN USE CHARGE RATE[2] 6%
Determined as of March 31, 1983

Definition

The Loan Use Charge Rate is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the last day of the month.

Derivation

Nuexco bases the Loan Use Charge Rate upon:

A. Data from recently completed or pending loan transactions.
B. Rates included in firm proposals to borrow or lend.
C. Rates that potential borrowers and lenders have expressed as a willingness to pay or accept, but for which Nuexco is not aware of firm proposals.

[2] Monthly data for 1968 through 1981 appear on pages 32-34 of Report 162. Monthly data for 1982 appear on page 2 of Report 173.

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CURRENT MARKET DATA

SWU VALUE $106/SWU for FY83
SWU VALUE $110/SWU for FY84
Determined as of March 31, 1983

Definition

The SWU (Separative Work Unit) Value is Nuexco's judgment of the price, expressed in US dollars per SWU, at which transactions for the sale of significant quantities of SWU of any origin for delivery in the specified DOE fiscal year could be concluded as of the last day of the month.

Derivation

Nuexco bases the SWU Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.
E. SWU prices at varying tails assays and varying product assays are converted to the equivalent SWU price at the DOE Reference Transaction Tails Assay (presently 0.20 weight percent U_{235}) and a product assay of three percent U_{235} assuming feed costs calculated using the Nuexco Exchange Value and Nuexco Conversion Value determined as of the last day of the same month.

Comments

Nuexco does not consider the following in determining the SWU Value:

A. The price of SWU delivered under long-term contracts from primary suppliers, such as DOE, Urenco, or Eurodif.
B. The price of SWU delivered under other than arm's length transactions.

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CURRENT MARKET DATA

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates	per kg U_3O_8 in Concentrates	per kg U in Concentrates
Australia (dollar)	25.68	56.61	66.76
Belgium (comm. franc)	1,070	2,358	2,781
Canada (dollar)	27.39	60.39	71.21
Finland (markka)	121.72	268.34	316.44
France (franc)	161.82	356.75	420.69
FRG (mark)	54.02	119.09	140.43
Italy (lira)	32,246	71,091	83,833
Japan (yen)	5,336	11,763	13,872
Netherlands (guilder)	60.89	134.24	158.31
South Africa (rand)	24.36	53.70	63.32
Spain (peseta)	3,048	6,720	7,924
Sweden (krona)	167.42	369.10	435.25
Switzerland (franc)	46.18	101.81	120.06
UK (pound)	15.16	33.41	39.40
US (dollar)	22.25	49.05	57.85

TRANSACTION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates	per kg U_3O_8 in Concentrates	per kg U in Concentrates
Australia (dollar)	24.64	54.32	64.06
Belgium (comm. franc)	1,026	2,263	2,669
Canada (dollar)	26.28	57.94	68.33
Finland (markka)	116.79	257.49	303.64
France (franc)	155.27	342.32	403.67
FRG (mark)	51.83	114.27	134.75
Italy (lira)	30,942	68,215	80,442
Japan (yen)	5,120	11,287	13,311
Netherlands (guilder)	58.43	128.81	151.90
South Africa (rand)	23.37	51.53	60.76
Spain (peseta)	2,925	6,448	7,603
Sweden (krona)	160.65	354.17	417.65
Switzerland (franc)	44.31	97.69	115.20
UK (pound)	14.54	32.06	37.81
US (dollar)	21.35	47.07	55.51

[1] Calculated using currency exchange rates published in the Wall Street Journal on March 31, 1983.

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CURRENT MARKET DATA

CONVERSION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U as UF_6	per kg U as UF_6
Australia (dollar)	1.62	3.56
Belgium (comm. franc)	67.31	148.39
Canada (dollar)	1.72	3.80
Finland (markka)	7.66	16.88
France (franc)	10.18	22.45
FRG (mark)	3.40	7.49
Italy (lira)	2,029	4,473
Japan (yen)	335.73	740.16
Netherlands (guilder)	3.83	8.45
South Africa (rand)	1.53	3.38
Spain (peseta)	191.78	422.80
Sweden (krona)	10.53	23.22
Switzerland (franc)	2.91	6.41
UK (pound)	0.95	2.10
US (dollar)	1.40	3.09

SWU VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	FY 1983 per SWU	FY 1984 per SWU
Australia (dollar)	122.33	126.95
Belgium (comm. franc)	5,096	5,288
Canada (dollar)	130.49	135.42
Finland (markka)	579.87	601.75
France (franc)	770.91	800.00
FRG (mark)	257.34	267.06
Italy (lira)	52,623	59,420
Japan (yen)	25,420	26,379
Netherlands (guilder)	290.09	301.04
South Africa (rand)	116.04	120.42
Spain (peseta)	14,521	15,068
Sweden (krona)	797.59	827.69
Switzerland (franc)	220.01	228.31
UK (pound)	72.21	74.93
US (dollar)	106.00	110.00

[1] Calculated using currency exchange rates published in the Wall Street Journal on March 31, 1983.

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CURRENT MARKET DATA

TRANSACTION SUMMARY[1]

Uranium Transactions

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current E.V.	Seller	Buyer	Remarks
2194	unknown	Less than 50	unknown	Far East Entity	Far East Entity	
2200	1984-92	More than 6,000	unknown	Canadian Producer	European Entity	
2202	1983	Less than 50	102	US Producer	US Utility	
2223	1983	601-1000	106	Canadian Producer	European Entity	
2225	1983	51-100	100	unknown	US Producer	
2226	1983	Less than 50	106	US Producer	US Producer	
2242	1983	51-100	Less than 98	US Producer	US Utility	Price related to market Not arms length

Conversion Transactions

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U equivalent)	Approximate Price as Percent of Current C.V.	Seller	Buyer	Remarks
2245	1983	101-300	Less than 100	US Entity	US Utility	

Loan Transactions

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current L.U.C.R.	Lender	Borrower	Remarks

There are no loan transactions reported this month.

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[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.

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URANIUM SUPPLY
(As of 3/31/83)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8)		Remarks
	Within 1 Year	Beyond 1 Year	
Available for Sale:			
ACTIVE			
1575		500 per year	Long Term
1818		300 per year	Long Term
1921	2,100		UF_6
2017		2,300	
2038	2,000		UF_6
2056	2,200		UF_6
2203	1,200		
TOTAL:	7,500		
INACTIVE			
1928	1,000		UF_6
2134		300 per year	Long Term
2196	500		
TOTAL:	1,500		

[1] Measured from the date of this Report

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CURRENT MARKET DATA

URANIUM DEMAND
(As of 3/31/83)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8)		Remarks
	Within 1 Year	Beyond 1 Year	
Inquiries to Purchase:			
ACTIVE			
1871		250 per year	1984-86
1996	400		
2010		400 per year	1984-92
2030		1,000	1984-85
2042		400 per year	Long Term
2061	25		
2115	200	200	
2123	500	500 per year	1983-87
2152		750 per year	Long Term
2163		400 per year	U_3O_8 or UF_6
2167	250	250 + per year	1984-99
2187	100		
2217	900	500 per year	1984-95
2238	50		Enriched UF_6
2269	250		
2270	175		
TOTAL:	2,850		
INACTIVE			
1459		200 per year	Long Term
1843	250		
1888		400 per year	Long Term
1999		50 per year	1985-90
2025		350	
TOTAL:	250		

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[1] Measured from the date of this Report.

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CONVERSION SUPPLY
(As of 3/31/83)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U as UF_6)		Remarks
	Within 1 Year	Beyond 1 Year	
ACTIVE			
1609	500	1,500 per year	Long Term
1840	130		
1936	1,000	200 per year	Long Term
2051	1,000		
2143	400		
TOTAL:	3,030		
INACTIVE			
2008	800	800	
2181	650	650 per year	Long Term
TOTAL:	1,450		

CONVERSION DEMAND
(As of 3/31/83)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U as UF_6)		Remarks
	Within 1 Year	Beyond 1 Year	
ACTIVE			
2129	500	500	
2135	135	135 per year	1984-87
2148		400 per year	1984-90
2190	100	100 per year	Long Term
TOTAL:	735		
INACTIVE	None		

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[1] Measured from the date of this Report.

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CURRENT MARKET DATA

LOAN SUPPLY AND DEMAND
(As of 3/31/83)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8)		Remarks
	Within 1 Year	Beyond 1 Year	
Available for Loan:			
ACTIVE			
1938	1,500		
2121	600		
2128	2,500		
2204	500	200 per year	Long Term
TOTAL:	5,100		
INACTIVE			
1815	1,000		UF_6
1884	600		
1910	1,000		
1931	600		
2036	500		UF_6
2040	600		UF_6
2133	200		
2139	2,000		
2157	600		
TOTAL:	7,100		
Inquiries to Borrow:			
ACTIVE			
1998	200	200	
2006	600		
2070	200		UF_6
TOTAL:	1,000		
INACTIVE	None		

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[1] Measured from the date of this Report

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AFRICA

Niger's uranium sales during 1982 are summarized in Table 1.

Table 1

NIGER URANIUM SALES IN 1982
(Thousands of Pounds U_3O_8)

Buyer	Seller
France	6,601
Germany, Federal Republic	325
Italy	325
Japan	2,702
Netherlands	260
Spain	520
TOTAL	10,733

South Africa

Public statements released in recent months by senior mining house officials in South Africa are noteworthy in several respects.

1. They have been consistent in their expectation that their earnings pictures are not likely to improve substantially for some time.

2. They have revealed a sensitivity to the impact spot prices have had on the "market" prices negotiated under their long-term contracts.

3. As information on uranium matters is tightly controlled in South Africa, the fact that these views have been expressed publicly implies that they reflect some degree of consensus regarding future market behavior.

Some highlights are presented below:

1. In a review of the uranium market released March 30, Messrs. G. Langton and D.A. Etheridge, senior officials of Anglo-American and chairmen of Western Deep Levels and Vaal Reefs, respectively, commented as follows:

"Uranium prices on the spot market resumed their falling trend at the beginning of the year and by August had reached their lowest level since 1975. Prices have since recovered somewhat, although they remain beneath those ruling at the start of 1982.

"A decline was halted, initially, by prospects of legislation in the US that would have limited imports of uranium. In the event, the legislation was not enacted. Taken with decreased liquidation of surplus utility inventories, as interest rates and carrying costs fell, near-term market sentiment altered. As a result, certain consumers started to buy material for inventory in the expectation of substantial price increases in the longer term. As prices rise, such purchases may be expected to fall away. There remains, nevertheless, a substantial imbalance between supply and demand and, in spite of projections of declining inventory levels relative to consumption, the quantities of uranium overhanging the market suggest that the situation is unlikely to improve significantly for some time.

"While prices negotiated with our customers in terms of long-term contractual sales have not declined to the same extent as spot prices, we see little likelihood of an improvement in our revenues in the immediate future."

2. The chairman of Randfontein and Western Areas, Mr. G. Y. Nisbet, commented as follows:

"The uranium price decline, which began in 1979, continued during 1982. The lowest uranium spot price as published by Nuexco in 1982 was $17.00 per pound in September and October of that year, compared with a price of $23.50 in December, 1981. This reduction in the spot price has been a reflection of a basic imbalance between demand and supply following a worldwide reduction in energy consumption. In the absence of significant decreases in uranium production, stocks continued to increase substantially. Sales from stock by American utilities committed to purchase quantities of material substantially in excess of their requirements and the sale of uncommitted production by certain North American producers exacerbated the decline in the uranium price.

"Fortunately, however, most major consumers with long-term contracts for their requirements have taken a realistic view of the decline in the uranium price in order to ensure continuity of supply. As a result, the price associated with such contracts has, in many instances, not been as severely affected as it might otherwise have been. In addition, the lower rand/dollar exchange rate that prevailed during most of 1982 offset, to some extent, the lower dollar price.

"Towards the end of 1982 the Nuexco uranium spot price increased to $19.75 per pound. Although this may suggest that the decline in the market has been arrested, the industry is still faced with the fact that production will probably exceed demand for some time to come, particularly while regulatory constraints and concerns

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about environmental issues influence the construction of further nuclear power facilities in the United States and other industrialized countries. However, the force of these considerations should diminish if any significant upturn occurs in the demand for electric power."

3. The chairman of Anglo American Gold Investment Company, Ltd. (Amgold), Mr. J. Ogilvie Thompson, commented as follows:

"Although spot uranium prices declined further during the year, they now show a significant improvement on the lowest prices, reached early in the second half of 1982. The turning point came when it seemed that legislation to restrict imports of uranium into the US was imminent. At the same time, a fall in US interest rates, and hence carrying costs on inventory, lessened the rate and volume of offers of surplus inventory for sale by electric utilities. The consequent improvement in short-term market sentiment has had some impact on longer-term price expectations. As a result, certain consumers began to buy additional material at what they considered bargain prices, even allowing for the cost of financing stocks for several years. At higher spot prices, this off-take has in large part fallen away.

"The spot market, however, represents only a very small proportion of international uranium trading and there remains a considerable surplus of material, in spite of the probable deferment of some projects still in the planning stage and of substantial cuts in production. These have been mainly in the US, but there have also been reductions in other countries including South Africa, where production fell to 6,877 tons in 1982 from 7,001 tons in 1981. Although utility inventory levels relative to consumption are likely to fall, the fact that negotiated prices under long-term contractual arrangement have not declined to the same extent as spot prices suggests that this market will not see any significant improvement for some time to come."

AUSTRALIA

Under the leadership of Mr. Robert James Lee Hawke, the Australian Labor Party (ALP) won a decisive victory in the Australian general elections on March 5, 1983. On March 8, the first Hawke Cabinet was selected consisting of 27 members. The fact that only three identify themselves with the extreme left constitutes an overwhelming triumph for the ALP moderates.

In a break with Labor Party tradition, Mr. Hawke appointed an inner cabinet of 13 senior ministers who will act as the primary decision-making body. This move has enabled Hawke to consolidate his power and to depend less upon the Labor Party caucus. The inner cabinet is made up of pragmatists who understand the importance of balanced government and the need to build solid bridges with the business community. Both the Treasurer and the Minister for Trade are also known for their support of minimum government interference with the marketplace.

Mr. Stewart West, who administers the portfolio of Immigration and Ethnic Affairs, is the only member of the inner cabinet who is of the extreme left.

The new Minister for Resources and Energy, Senator Peter Walsh of Western Australia, has been known for his tough, no-holds-barred style of politics. The former wheat farmer who entered Parliament in 1974 has been the opposition spokesman on primary industry, finance, trade and national development as well as resources. His attitude towards uranium is likely to be shaped by the party's collective interpretation of the role Labor Party policy must play in uranium activities.

It is premature to make an assessment of the Labor Party's uranium policy. However, the prevailing attitude is one of cautious optimism as more than half of the inner cabinet members seem to hold pro-uranium views.

The Atomic Energy Act, which regulates the ownership of uranium in the Northern Territory, will be administered by the Minister for Resources and Energy (Peter Walsh). As the Minister for Trade (Nigel Bowen) controls uranium export policy, the new government will continue with the traditional split of responsibility between domestic development and export. Because all uranium resources are owned by the states until mining rights are granted to a developer (except those resources found in the Northern Territory), the Minister for Resources and Energy has limited influence in uranium matters except as they relate to the Northern Territory.

Overall, Mr. Hawke has chosen a cabinet which will focus on efficiency and aim for effective economic management. The overall level of capability within his cabinet, coupled with the absence of militant social reformers, is a strong indication of the contrast between the Hawke administration and the Whitlam era of 1973-1975.

* * *

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At present, plans for the administration of uranium matters, especially regarding exports, are still under consideration. The AUEO (Australian Uranium Export Office) will stay in the Trade Department. While the new Minister for Trade (Nigel Bowen) has been briefed on the contract approval system, new export permits under existing contracts of Energy Resources of Australia, Ltd. and Queensland Mines, Ltd. will not be needed in the near future, so, therefore, will not call for immediate action or implementation.

In Australia, uranium marketing takes place under ministerial determinations. While these determinations remain in force, prospective producers are entitled to pursue market opportunities. If the new government does not change this system, it will tacitly consent to uranium sales from new projects. Direct intervention, in the form of a cancellation of these determinations, would be seen by the market as a signal for great caution. This particular issue is expected to trigger discussions between uranium producers and the new government — discussions the uranium industry would most likely not press for at such an early stage of policy development. The industry's perception is that it would be more advantageous to allow the government to grapple with issues of higher priority before calling for the establishment of universal uranium policy.

Australia's economic conditions leave the government little choice other than to continue with the development of projects and exports. However, if the government wishes to give the appearance of leaving the future of new mines to the market, it need only retain the old price guidelines. If taken at face value, they would make it impossible to obtain new contracts for a considerable period.

* * *

The UEGA (Uranium Enrichment Group of Australia) will probably proceed quietly with their market study, anticipating that the government's involvement will not become relevant until UEGA decides to proceed with their full feasibility study. At that time they would require that the government be involved in the tripartite safeguards agreements between the Urenco countries and Australia.

* * *

The South Australian government has indefinitely deferred the two in-situ leach uranium projects, Honeymoon and Beverley. The state Minister for Mines and Energy justified the decision on the basis of the ALP's federal uranium policy platform and upon environmental grounds. The government believes it to be better policy to promote the large Olympic Dam copper uranium development now undergoing feasibility testing than to promote two smaller mines. In the near term the government is constrained by an ambivalent ALP uranium policy which allows existing producers to continue operations but makes room for the Olympic Dam development. Under this policy it seems that one may interpret that there may be enough flexibility to allow for both an expansion of ERA's Ranger project and the sale of Queensland Mines surplus production to absorb whatever contracts may come to Australia before the Olympic Dam project can be marketed. Although other Australian projects might potentially be able to demonstrate their feasibility by obtaining sufficient uranium contracts to baseload their plants at acceptable prices, the government is not convinced that this will occur in the next two years. However, the next ALP federal convention in 18 months may offer the government the opportunity to free uranium policy from the more restrictive clauses.

Within the constraints imposed by the realities of the uranium market and the limitations set by the present party platform, the ALP government's uranium development objectives will probably leave the operating projects largely undisturbed. Negative as it may seem at present, the weakness of the uranium market may have also some saving effects: For the government, it bridges the period to the next ALP convention, where a less ambivalent policy could emerge without the need to make discouraging decisions in the meantime. Therefore, the industry seems sheltered for the moment from drastic phase-out decisions which could affect projects still in the planning stage, barring the two exceptions in South Australia. However, the selective support shown by the government has left most, if not all, other uranium projects in a questionable position. Furthermore, uncertainty regarding the government's policy could erode international market confidence. On the other hand, unless the market responds more favorably to the Australian producers' on-going sales efforts, their planned development timetables could be set back considerably.

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RECENT DEVELOPMENTS

EUROPE

Belgium

In Report 174, Nuexco mentioned that Belgium's decision on whether to purchase a 20 to 25 percent share in two 1300 MWe plants France would build at Chooz depends on a determination of the nation's energy policy. That decision has been postponed even further, largely due to disagreements between the Flemish and Walloon segments of the population.

France

France and India have finally signed the agreement on the supply of nuclear fuel for the US-built nuclear power plant at Tarapur, in Maharashtra State near Bombay. The first delivery of enriched uranium will be sent in the next two or three months to the Indian fabrication plant at Hyderabad. The London Club's agreed safeguards stipulations on the enriched uranium will only apply until 1993, but bilateral talks are expected to start soon to agree to additional safeguards which would be enforced after that date.

* * *

France and Pakistan have begun talks on the supply by Framatome of a 900 MWe PWR which Pakistan wants to build at Chashma, 150 miles southwest of Islamabad. Financing will be a major obstacle for the plant. The other problem is one of safeguards. While the plant itself will be subject to IAEA safeguards, M. Cheysson, the French Foreign Minister, has admitted that France will not be following the London Club's safeguards agreement which necessitates that all nuclear installations be placed under international control. This issue of full-scope safeguards is one which is becoming increasingly controversial for France.

* * *

The Superphenix fast breeder reactor (FBR) is approximately 80 percent complete and present plans call for it to be connected to the grid in mid-1984. The Phenix FBR commercial demonstration project, which was shut down on February 15, is now operating at two-thirds of its nominal capacity of 250 MWe. The shutdown was brought about by a leak in the third steam generator. Three other similar incidents have taken place due to the wear of non-nuclear parts after nine years of operation.

* * *

Electricité de France (EdF) has obtained authorization to build the first unit of its nuclear power plant at Golfech in the Tarn and Garonne (near Toulouse). This unit will be a 1300 MWe PWR, the first of four such units EdF would like to build on the site. The project was one of those most disputed by ecologists and was "frozen," then "unfrozen" by the Socialist government of M. Mitterand.

On February 26, EdF received official authorization for construction of the first unit of the plant to be built at Penly, east of Dieppe. It is scheduled to enter into service in 1989.

EdF presently plans to connect Blayais Unit 3 to the grid by the end of April. Blayais Unit 4 is to follow two months later. Both units are 900 MWe PWRs.

* * *

Spain

Spain's Socialist government favors reducing the nation's nuclear power program to an installed nuclear capacity of 7,500 MWe by 1990 rather than the 11,500 MWe by 1987 which the previous government had been aiming for. Six units, aggregating approximately 5,900 MWe, are vulnerable to cancellation or delays:

1. Trillo Units 1 and 2 — 1,000 MWe PWRs scheduled for operation in 1985 and 1987, respectively;
2. Valdecaballeros Units 1 and 2 — 975 MWe BWRs scheduled for operation in 1986 and 1988, respectively;
3. Vandellos Unit 2 — 960 MWe PWR scheduled for operation in 1987;
4. Sayago — 1,000 MWe PWR which might have been built at Sayago.

Sr. Alfonso Alvarez Miranda, President of the Spanish Atomic Forum, has indicated to the government that this action would increase unemployment and hinder the country's industrial growth. It has been estimated that about 20,000 people would have to be laid off in the nuclear industry. Such a course of action would run counter to the Socialists' promise to create 800,000 new jobs in the next four years. If the plants under construction were not completed, about 225 billion pesetas would be lost. The Socialist government has declared that conversion of the threatened plants to coal would make the loss of investment minimal, so the prime issue would be the preservation of jobs.

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United Kingdom

The signing by British Nuclear Fuels, Ltd. (BNFL) of a major contract for the supply of fuel for the British nuclear submarine fleet will require the construction of another gas centrifuge enrichment plant at Capenhurst, England. Construction is scheduled to take four years at a cost of approximately 100 million pounds. Present plans call for the new Capenhurst plant to enrich the fuel to an intermediate level and for the remainder of enrichment (to higher levels) to be carried out elsewhere.

The trade press has reported that BNFL is about to sign contract(s) for the purchase of "a few hundred tonnes" of uranium on the spot market, essentially to supply the working inventory for the newly commissioned enrichment plant. The purchase will also serve as a buffer stockpile and increase the flexibility of plant operations.

JAPAN

Initial results of annual price negotiations between Japanese utilities and their major suppliers of uranium under long-term contracts appear to indicate that the downward price trend of recent years is continuing. During March, a group of Japanese utilities agreed to pay approximately $33 to $34 for 1984 deliveries from African suppliers. After paying approximately $45 per pound U_3O_8 for 1981 deliveries, Japanese utilities negotiated price reductions of $5 to $7, so that 1982 prices were in the range of $37 to $38.50. Agreed prices for 1983 were approximately $35.50, a reduction of $1.50 to $3.

The agreed prices for 1984 represent further reductions of approximately $1.50 to $2.50. Just three months ago, it appeared likely that the Japanese utilities would demand, and receive, reductions of $5 to $10 per pound. However, the spot/near-term market price recovery of recent months has somewhat mitigated the disparity between spot/near-term prices and long-term prices, so as to reduce the pressure for larger price reductions. Expectations of continuing spot/near-term price increases, combined with the Japanese utilities' desire to maintain good relations with long-term suppliers may also have played a part.

UNITED STATES

EDITED LUNCHEON REMARKS OF GEORGE WHITE, JR.

Kansas City
March 21, 1983

Nuexco was founded in 1968 by Payne Kibbe and George White, Sr. Bob Wolcott, Nuexco's current Chairman and C.E.O. has been associated with the firm since that time, as a founding Director and President. We currently employ a total of 28 people in 4 offices: Menlo Park, California; Stamford, Connecticut; Ferney Voltaire, France; and Atlanta, Georgia. In addition, we have a network of 12 representatives and special consultants in the United States and overseas in various uranium producing and uranium consuming areas.

Our business activities fall into three main areas:

1. We are publishers — most of you are familiar with the Monthly Report.

2. We are consultants — we develop analyses and studies on supply and demand, prices, procurement and marketing strategies and assorted other topics. We work on both a custom and multi-client basis.

3. Finally, we are brokers of fuel cycle materials and services. We are not traders. We do *not* take principal positions for our own risk and account. Similarly, our standard fees are related to quantities of material transacted and not the price of the transaction. From a business standpoint, we are indifferent to price.

I would now like to share some thoughts about the nuclear fuel market.

1. The nuclear fuel market is currently characterized by excessive productive capacity and excess inventory. The fact of the matter is that our ability to produce uranium, conversion and SWU far exceeds our current and even longer-term utilization rates. Excess capacity and idle capital investment are bad enough, but even worse, production continues in excess of consumption, and inventories continue to increase.

The development of enormous excess inventories exerts, in turn, enormous financial strain on the inventory holders, which in turn leads to inventory liquidation. Such liquidation, as we have seen, has led to a collapse of uranium spot prices and the development of severely discounted markets for conversion and enrichment services. One is inescapably led to the conclusion that prices will be weak, and buyers will dominate the market until the inventory liquidation is complete.

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RECENT DEVELOPMENTS

A second conclusion is that production rates must and will, in time, be more nearly rationalized with consumption rates. We have seen the beginning of this rationalization. The bold plans to produce more uranium, more conversion and more SWU ran head first into the reality that there simply weren't enough buyers. Quite correctly, most of these plans have been cancelled or deferred.

2. The nuclear fuel market will be characterized by an unending series of boom-bust cycles. My reasoning is based on the fundamental nature of the utility charter; namely, reliable service at the lowest possible rates consistent with a regulated rate of return sufficient to attract investment capital. If only five words could be used to describe utility business philosophy, I would choose the words "conscious policy of risk aversion." This is not intended to be critical of utilities, but merely a statement of the way things are and must be. I personally prefer cheap electricity. However, I prefer expensive electricity to no electricity at all.

Risk aversion translates into policies of conservatism. Too much, too soon may not be desirable, but it certainly beats too little or too late. Too much, too soon dictates excess productive capacity, be it in uranium, conversion or enrichment. Excess capacity and inventory build-up lead to price weakness. Price weakness is followed by a diminution of new capital investment, then later by utility concerns of future shortages, then later by higher prices, etc.

It has been said that those who don't learn from history are bound to repeat it. In this case, however, the utilities cannot be blamed. It is a condition of their existence.

As you are aware, uranium is a unique commodity. It has but one use. It is, so far as buyers are concerned, totally price inelastic. There will *never* be a real demand-pull situation in uranium. The best that sellers can ever hope for is a perception of future shortage, to drive up prices. Classic economic theory must be recalibrated to take account of both the unique nature of uranium as well as the unique nature of its user group.

3. The nuclear fuel market has become a truly international one. US uranium is flowing to Europe, Taiwan, Korea and Japan. Canada, South Africa, Australia, Namibia and Niger also ship to customers around the world. US utilities contract for conversion in Canada and Europe as well as the US. Europeans, Japanese, Taiwanese, Koreans and others buy conversion in the US, France, Canada, and the UK. The development of the secondary conversion market has added to this mix.

In the enrichment area, the monopolistic position of DOE is a thing of the past. Eurodif, Urenco, and the USSR have captured significant market share. Assignments and sales of SWU in the secondary market have become an enormous business, crossing international boundaries with ease.

It is now a world market. Embargos and cartels, government sponsored or otherwise, designed to regulate commerce are doomed to fail, as are legislative attempts made in the name of non-proliferation. The efforts of the US government in this area are the clearest demonstration of just how counter-productive such efforts can be. The dominant US enrichment position has been lost; the US is no longer viewed as a credible supplier. South Africa, Brazil and others are moving as rapidly as possible to create indigenous enrichment capacity. That's not what I would call a very effective non-proliferation policy.

In the commercial area, Australia's uranium floor price policy gave Canada a once-in-a-lifetime opportunity to sweep the market for two years. My thought here is very simple — if I may borrow a term from my Wall Street past, "Don't fight the tape — you'll get killed."

Finally, I would observe that the previous comments suggest a very complex market in which the financial stakes are enormous. Four hundred million pounds of excess U_3O_8 at $25 per pound represent a capital investment of $10 billion. At 15 percent, the carrying cost alone is $1.5 billion annually. If conversion and SWU are added, we are talking of waste, in our relatively small industry, of more than $3 billion annually.

Consider a European seller of enriched product which is physically located in Europe. Before the transaction is fully concluded, it may involve a Japanese buying SWU through a de-enrichment swap, followed by a US utility purchasing the conversion component via a location and de-conversion swap, followed by Canadian producer purchasing the U_3O_8, after a nationality swap, for delivery at US converter to a European buyer. This is not a flight of fancy. Such transactions do occur. These are complicated deals requiring technical skills, commercial savvy, regulatory knowledge, timing and a fair measure of good luck.

In conclusion, I would note my view that the market will not settle down. Rather, it is going to be more volatile, more complex, and more expensive.

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THE ARIZONA STRIP

Introduction

Exploration for uranium throughout the Arizona Strip country and the south bank of the Colorado River continues almost unabated. Even though there are fewer companies exploring than reported one year ago by Nuexco (Report 163, March 1982), the district is perhaps the most active in the world today for uranium exploration. At least six companies are competing for exploration and mining rights to uranium as it occurs in breccia pipes — circular, chimney-like masses of highly fragmented rock found within the extensive drainage system of the Grand Canyon region. The acreage controlled by the active companies is situated in the northern portion of Mohave and Coconino Counties, Arizona. Total acreage has increased from about 600 thousand acres last year to well over one million acres today. The area of interest has only recently expanded northward into Utah.

Present exploration activities primarily consist of prospecting for surface evidence of pipe structures, usually along canyon rims, and follow-up staking of mining lode claims over favorable structures. After a pipe has been located, detailed geologic, geochemical and geophysical studies are made to determine priorities for drilling the pipe. However, due to competition for exploration targets, drilling is secondary to gaining a land position as illustrated by the fact that acreage claimed or leased during 1982 was almost double that of 1981; drilling was limited to less than 300,000 feet in 1982.

Mining activity is currently limited to two pipes. The Hack 1 and 2 mines, located in Hack Canyon, are being mined at a combined daily rate of 800 to 1000 tons of ore per day. All ore is currently being stockpiled at the respective mines. A third pipe is currently in the final stages of mine development, and mining permits are pending on yet a fourth pipe. Several more pipes are in the final phase of exploration, but the majority of known pipes remain to be adequately explored.

Structural Analysis of Breccia Pipes

The formation of breccia pipes in the Grand Canyon district is considered to be directly related to the simultaneous occurrence of regional structural events and erosion by the Colorado River drainage system. Pronounced structural changes began to occur in early Paleocene time (Tertiary age) when the Kaibab uplift formed a broad dome throughout the Grand Canyon region. Major north-south trending faults and anticlinal and synclinal folding resulted from continued uplifting of the dome. A combination of the domal uplift and rapid erosion by the Colorado River created the Grand Canyon Gorge. The river and its major tributaries were in the present channel system by early Miocene time. As stream erosion cut lower, especially through the massive Redwall Limestone of Mississippian age, dramatic changes occurred in regional geohydrology. The permanent loss of natural hydrostatic pressure allowed rapid downward migration of aqueous solutions through all geologic strata, and large caverns were created in the Redwall Limestone. The caverns represent the initial development of a breccia pipe structure.

Continued solution activity gradually enlarged the dimensions of the caverns, especially vertically, to the extent that large rock segments from overlying formations began to subside into the cavity area. As the subsidence continued upward into the younger formations, a chimney-like structure formed. (In this context, a breccia pipe differs from a diatreme, which is a breccia-filled volcanic pipe formed by a gaseous explosion.) A continued and prolonged subsidence pattern resulted in fragmentation of "brecciation" of the downdropped rock segments. Concentric fracturing and faulting, referred to an annular rings, are common around the outer edge of the pipe as a component of rock stress created by erosion and subsidence. The structural features extend from the Redwall Limestone upward into the Kaibab Limestone and, in certain areas, into the overlying Moenkopi Formation. Breccia pipe structures may vary from about ten meters to 300 plus meters in diameter and are recognized on the surface by layers of tilted and broken rock. Such surface expressions of pipe structures are the much sought after targets for exploration groups. Figure 1 illustrates a breccia pipe in structural relationship with the sedimentary sequence in the Grand Canyon region.

Uranium mineralization was introduced into breccia pipe structures during late stages of solution migration (Miocene and Pliocene times). The probable source of the mineral-rich solutions was the massive sandstone and limestone formations of Permian age. Continuous fluctions of solution flow resulted in intense rock alternation and remobilization of minerals, primarily within the core of the pipe. A trace of mineralization was deposited in all formations influenced by pipe development; however, known high-grade uranium minerali-

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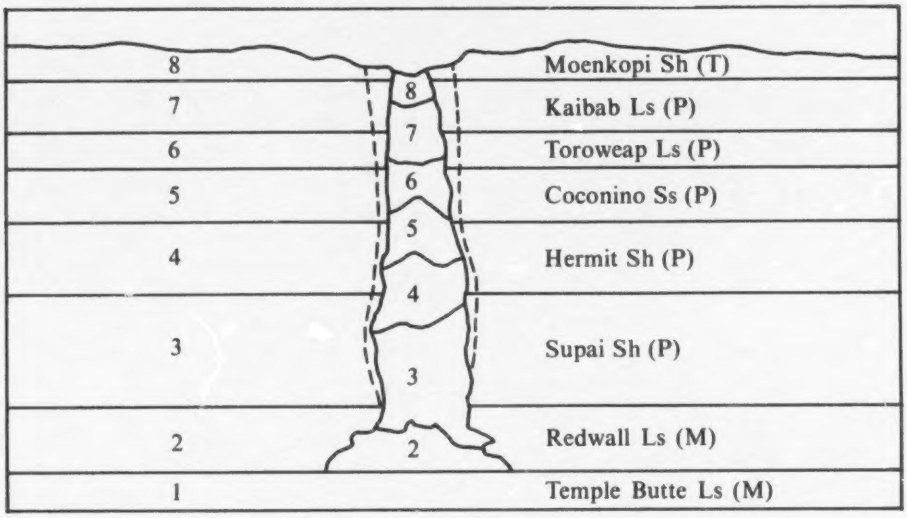
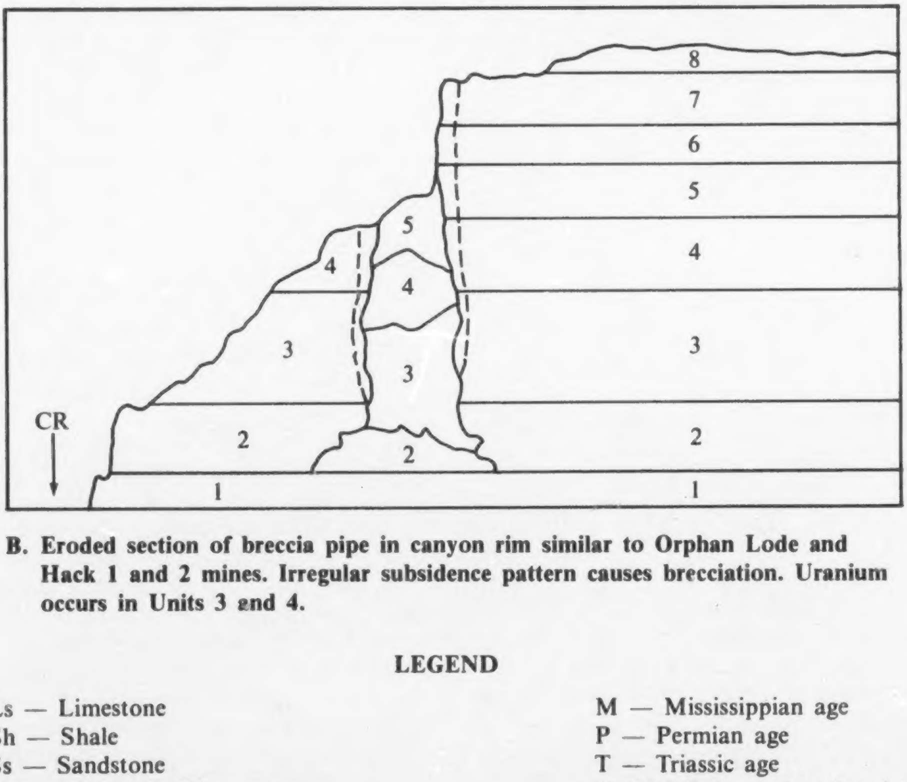
Figure 1

TYPICAL BRECCIA PIPE


8
7
6
5
4
3
2
1
8
7
6
5
4
3
2
Moenkopi Sh (T)
Kaibab Ls (P)
Toroweap Ls (P)
Coconino Ss (P)
Hermit Sh (P)
Supai Sh (P)
Redwall Ls (M)
Temple Butte Ls (M)

A. Vertical section of breccia pipe showing how subsidence might have occurred.


8
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3
2
1
CR

B. Eroded section of breccia pipe in canyon rim similar to Orphan Lode and Hack 1 and 2 mines. Irregular subsidence pattern causes brecciation. Uranium occurs in Units 3 and 4.

LEGEND

Ls — Limestone
Sh — Shale
Ss — Sandstone
CR — Colorado River gorge

M — Mississippian age
P — Permian age
T — Triassic age
Dashed lines — Annular ring faults

Formations numbered to illustrate magnitude of subsidence.

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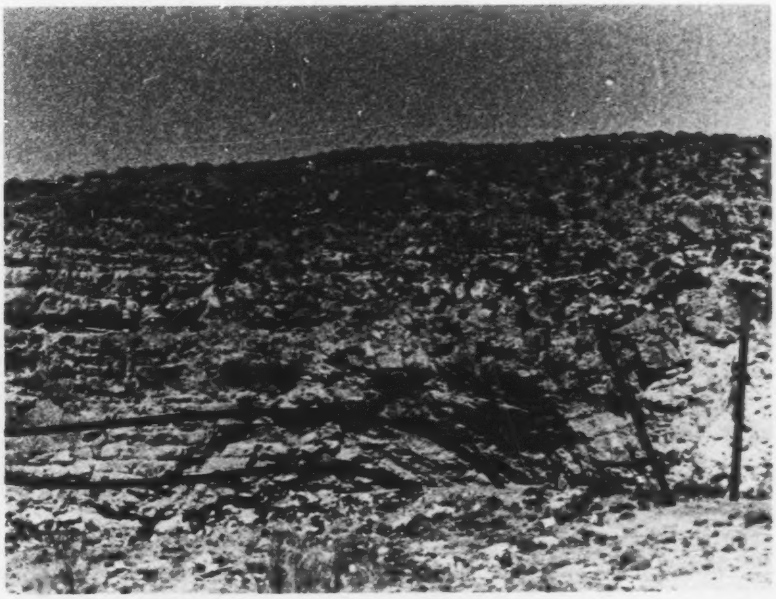
zation is thus far limited to the annular ring and brecciated segments of the Supai and Hermit formations. Uraninite and coffinite are the important uranium minerals present; torbernite and metatorbernite are the most common secondary minerals present.

Figures 2 through 8 show several important structural features associated with breccia pipes. Taken separately or in combination, the features represent useful geologic guides to prospecting for breccia pipes:

Figure 2

PIPE 1 — Apparent edge of a pipe structure as formed in the Kaibib Limestone. The near vertical lines on the right are faults and may represent at least two annular ring structures. The horizontal rock layers dipping downward indicate subsidence into the pipe. Estimated diameter of pipe is about 80 meters.



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RAW MATERIALS

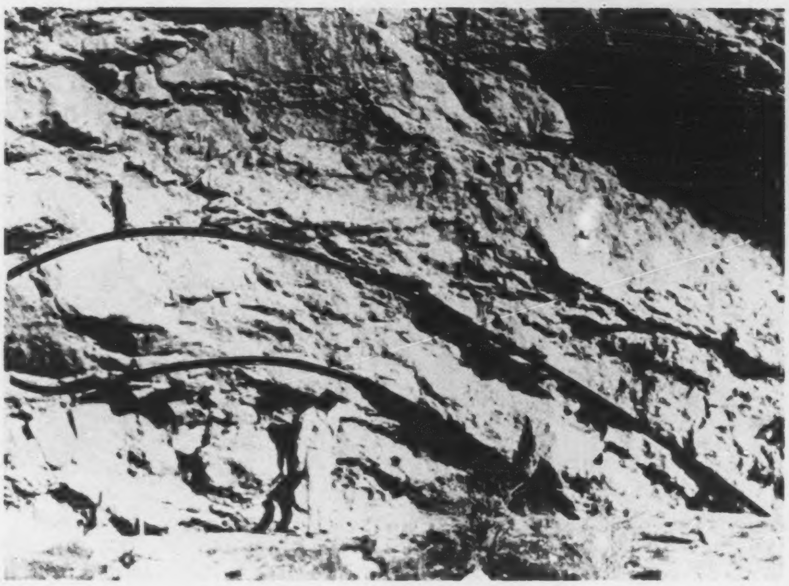

Figure 3

PIPE 1 — View of limestone layers dipping into the pipe, taken from distance of about 12 meters.

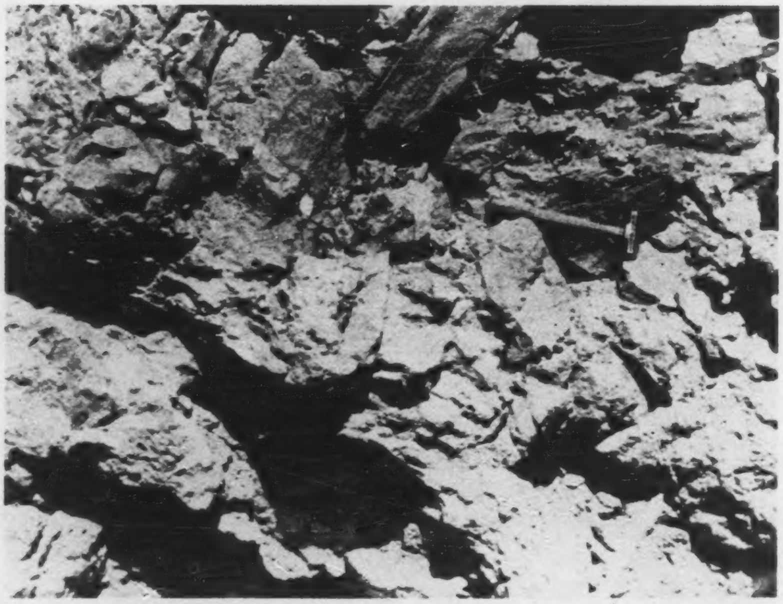

Figure 4

PIPE 1 — Close-up view of brecciated limestone. Picture position about middle portion of dipping beds of Figure 3. Scale illustrated by hand sledge.

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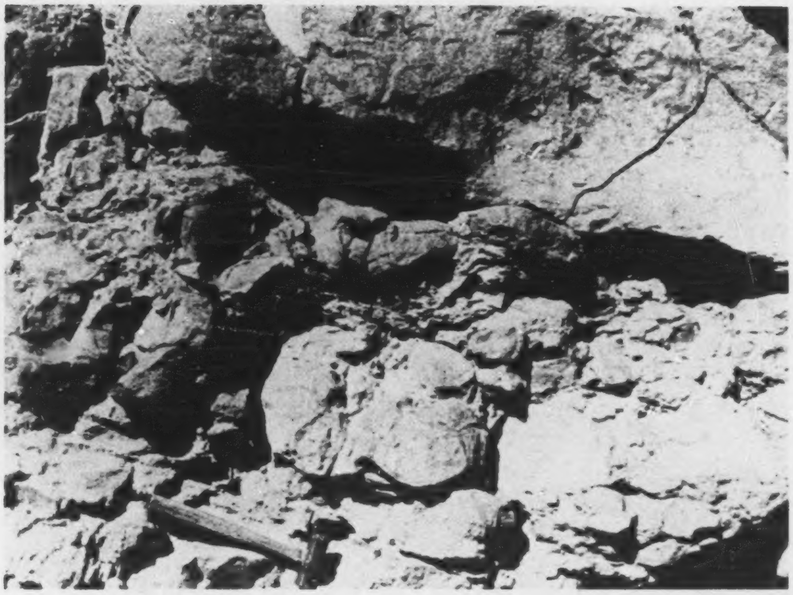

Figure 5

PIPE 1 — Close-up view of brecciated limestone. Picture position about 8 meters left of Figure 4. Note brecciation is less intense.

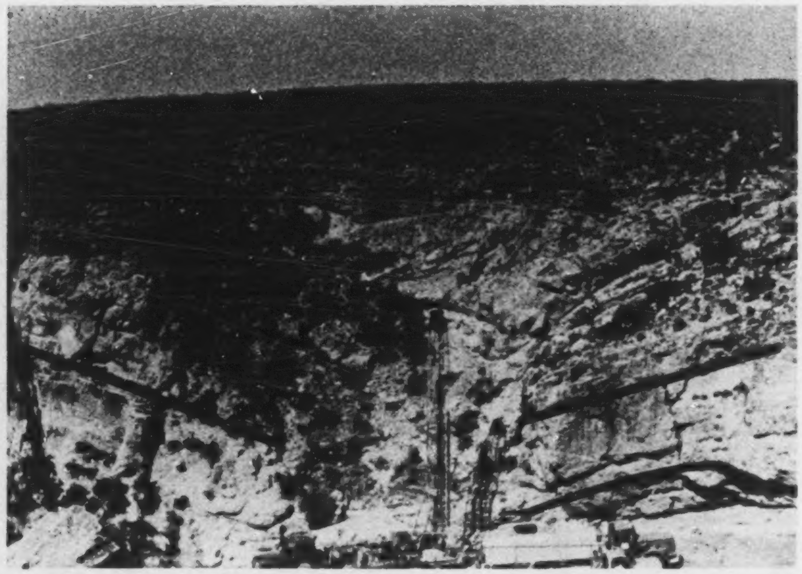

Figure 6

PIPE 2 — Erosional edge of top of pipe in Kaibab Limestone. Note subsidence of massive limestone toward center of pipe structure. Near vertical faults on left may be annular ring structures. Pipe diameter is about 35 meters. Drill rig is situated near center of structure.

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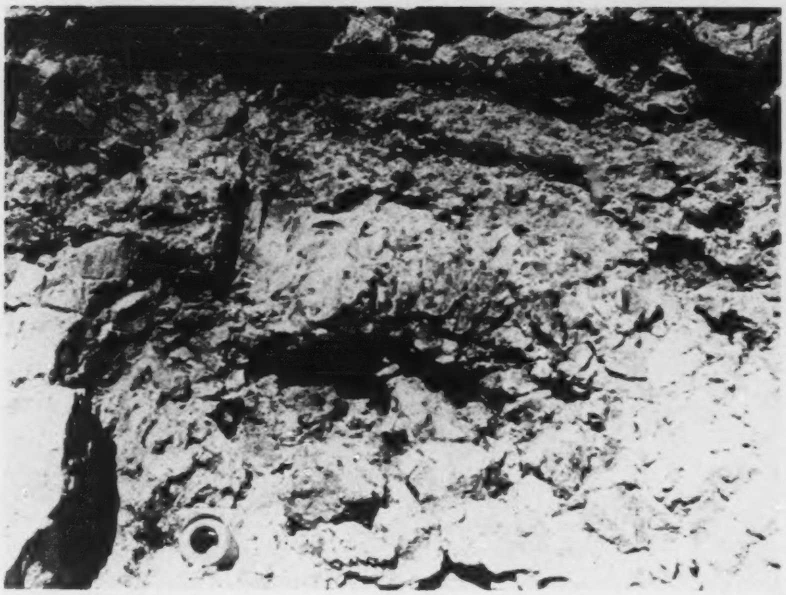

Figure 7

PIPE 2 — Close-up of brecciated limestone. Note small size of limestone fragments compared to roll of tape at lower left. Brecciation is more intense than in Pipe 1, probably due to the closer relationship to the center of the pipe structure.

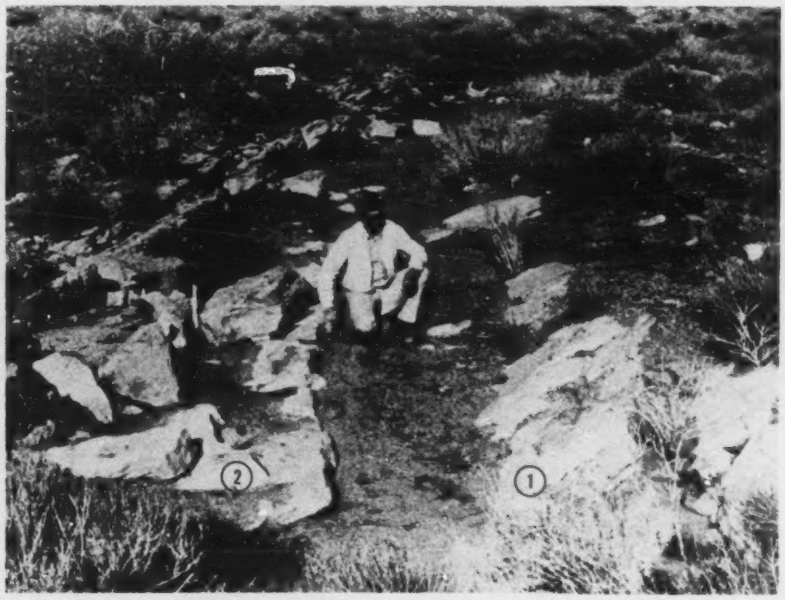

Figure 8

PIPE 3 — Note that all beds are dipping to the left. Bed 1 is Kaibab Limestone of Permian age; bed 2 is the overlying Moenkopi Formation of Triassic age. The Moenkopi is an erosional remnant filling a structural depression formed in the Kaibab Limestone. The dipping beds can be traced on surface to form a circular structure about 360 meters in diameter, making it one of the largest structures in the district.

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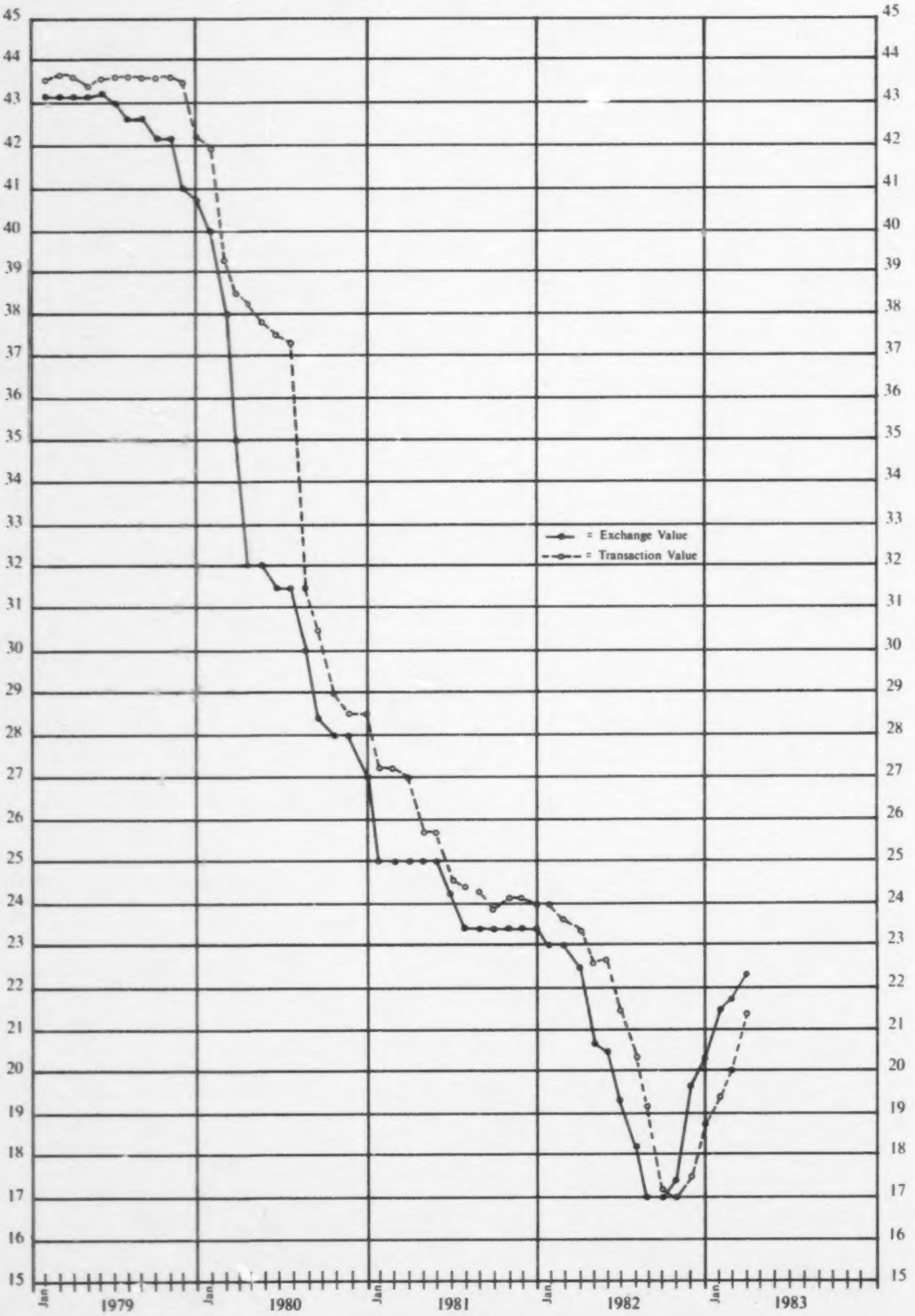
EXCHANGE AND TRANSACTION VALUES SINCE JANUARY 1979

Determined as of the last day of the month indicated



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HISTORICAL MARKET DATA

HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	21.75	**22.25**									

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	20.00	**21.35**									

HISTORICAL CONVERSION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	1.40	**1.40**									

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AUSTRALIA

	Price Index of Materials Used in Manufacturing Industry—All Groups (Year 1968-69 = 100.0)[1]	**Award Rates of Pay Indexes Australia—Adult Males In Mining Wage Earners, Weekly Rates (Year 1976 = 100.0)[2]**
Annual Avg. 1972[3]	105.6	71.26
Annual Avg. 1973[3]	124.4	78.96
Annual Avg. 1974[3]	141.9	108.07
Annual Avg. 1975[3]	150.4	132.55
Annual Avg. 1976[3]	168.4	160.93
Annual Avg. 1977[3]	192.0	179.03
Annual Avg. 1978[3]	198.5	190.04
Annual Avg. 1979	248.8	196.34
Annual Avg. 1980	321.8	218.00
Annual Avg. 1981	355.3	237.34
Annual Avg. 1982	367.9	—
Oct 1981	352.5	155.6[2]
Nov 1981	351.3	157.6R[2]
Dec 1981	349.9	167.6R[2]
Jan 1982	354.9	169.5R[2]
Feb 1982	356.7	171.1R[2]
Mar 1982	360.3	171.5R[2]
Apr 1982	367.7	171.5R[2]
May 1982	367.6	172.0R[2]
Jun 1982	367.2	173.2R[2]
Jul 1982	369.1	177.3R[2]
Aug 1982	371.5	178.2R[2]
Sep 1982	374.0	178.3R[2]
Oct 1982	377.2	178.4R[2]
Nov 1982	374.5P	178.5R[2]
Dec 1982	373.6P	179.5[2]

P = Preliminary R = Revised since last month

[1] Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0), Table 3.

[2] Australian Bureau of Statistics, Canberra: "Award Rates of Pay Indexes, Australia" (Catalogue No. 6312.0), Table 8. Figures are being converted to an Index number. As the data are converted, the new index numbers will be inserted. Figures for the latest fourteen months shown are subject to revision.

[3] Monthly data for 1970 through 1978 appear on pages 4.7 and 4.8 of Nuexco Report 138.

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GOVERNMENT STATISTICS

CANADA

		Wage-earner Data: Average Hourly Earnings (C$)[4] [5]		
	Industry Selling Price Index: Manufacturing (D 500000)[1] [2] (1971 = 100.0)	Metal Mining, including Milling (SIC 050-099)[3]	Primary Metal Industries, non-ferrous (SIC 296-298)	Chemicals and Chemical Products (SIC 370-379)
Annual Avg. 1978	190.4	8.75	6.82	6.97
Annual Avg. 1979	217.9	9.66	7.35	7.67
Annual Avg. 1980	247.2	10.80	8.05	8.50
Annual Avg. 1981	288.7	12.23	9.03	9.53
Dec 1981	280.0	12.96	9.42	10.03
Jan 1982	281.9	13.49	9.53	10.11
Feb 1982	283.5	13.61	9.60	10.19
Mar 1982	284.8	13.74	9.62	10.35
Apr 1982	287.7	13.81	9.79	10.48
May 1982	288.8	13.86	9.88	10.62
Jun 1982	289.7	13.83	9.92	10.69
Jul 1982	290.3	14.02	10.05	10.73
Aug 1982	290.3R	14.23	10.03	10.80
Sep 1982	292.5R	14.01	10.18	10.73
Oct 1982	292.2R	13.88R	10.18	10.86R
Nov 1982	291.4R	14.34R	10.43R	10.90P
Dec 1982	292.3R	14.26P	10.57P	11.08P
Jan 1983	292.7	—	—	—
Feb 1983	293.6	—	—	—

P = Preliminary R = Revised since last month

[1] Statistics Canada, Prices Division, Ottawa; "Industry Price Indexes" (Catalogue 62-011), Table 1. Indexes for the most recent six months shown are subject to revision.

[2] Monthly data for 1973 through 1978 appear on page 4.10 of Nuexco Report 138.

[3] The wage earner series in Nuexco reports prior to March 1983 was Metals (SIC 050-059).

[4] Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa; "Employment, Earnings and Hours" (Catalogue 72-002), Table 2.

[5] Monthly data for 1977 and 1978 appear on page 4.11 of Nuexco Report 138.

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REPUBLIC OF SOUTH AFRICA

	Average Declared Working Costs per Metric Ton of Gold Ore Milled (Rand)[1]	Consumer Price Index[2] (1975 = 100, except where otherwise indicated)	Producer[5] Price Index All Groups (1975 = 100)	Total Employment in Mining and Quarrying (Code 35)[7]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand) (Code 40)[7]
Annual Avg. 1971[3]	7.88	106.4[4]	59.1	652,294	415,956
Annual Avg. 1972[3]	8.79	113.3[4]	63.9	623,067	443,933
Annual Avg. 1973[3]	10.51	124.1[4]	72.3	684,743	572,133
Annual Avg. 1974[3]	13.18	138.5[4]	85.3	674,140	761,596
Annual Avg. 1975[3]	16.71	157.2[4]	100.0	639,473	1,003,617
Annual Avg. 1976[3]	19.30	174.7[4]	115.1	671,240	1,212,983
Annual Avg. 1977[3] [6]	23.87	194.4[4]	130.0	712,006	1,420,670
Annual Avg. 1978[3] [6]	27.14	137.2	142.7	664,571	1,537,169
Annual Avg. 1979[3] [6]	30.18	155.3	164.5	692,209	1,830,632
Annual Avg. 1980[6]	35.53	176.7	192.1	714,379	2,279,615
Annual Avg. 1981	41.89	206.5	218.3	728,506	2,820,505
Sep 1981	43.28	211.6	224.6	724,604	251,502
Oct 1981	—	213.4	227.0	717,918	248,159
Nov 1981	—	214.8	229.4	720,255	253,044
Dec 1981	44.52	216.3	230.4	709,612	257,655
Jan 1982	—	217.6	233.1	700,375	257,173
Feb 1982	—	220.2	236.8	705,992	250,191
Mar 1982	45.49	225.2	237.4	725,700	262,210
Apr 1982	—	228.9	241.9	707,502	252,562
May 1982	—	230.3	244.8	715,162	258,770
Jun 1982	45.77	232.1	246.7	707,552	261,361
Jul 1982	—	234.1	249.4	702,141	283,248
Aug 1982	—	236.8	253.4	705,562	276,730
Sep 1982	48.04	241.0	255.0	704,344R	282,782R
Oct 1982	—	243.9	260.1	701,316	285,328
Nov 1982	—	245.4	262.5	707,966	287,699
Dec 1982	49.62	246.2	263.0	—	—
Jan 1983	—	249.0	264.9	—	—
Feb 1983	—	253.1	—	—	—

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[1] Chamber of Mines of South Africa, Johannesburg; "Analysis of Working Results," published quarterly.

[2] Republic of South Africa Department of Statistics, Pretoria; "Government Gazette: Consumer Price Index for Urban Areas."

[3] Historical data for the Average Declared Working Costs and Consumer Price Index 1970-1979 appear on page 4.9 of Nuexco Report 140.

[4] April 1970 = 100.00.

[5] Previously known as the WHOLESALE PRICE INDEX, now the PRODUCER PRICE INDEX. The computation remains the same.

[6] Historical data for Codes 35 and 40 1977-1980 appear on page 28 of Nuexco Report 157.

[7] Bulletin of Statistics, Department of Statistics, Pretoria.

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GOVERNMENT STATISTICS

UNITED STATES

	Producer Price Index— Industrial Commodities (1967 = 100)[1]	Producer Price Index— All Commodities (1967 = 100)[1]	Consumer Price Index (1967 = 100)[2]	GNP Implicit Price Deflator (1972 = 100)[3]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[4]			
					Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
Annual Avg. 1972[5]	117.9	119.1	125.3	100.00	4.56	4.59	4.26	3.71
Annual Avg. 1973[5]	125.9	134.7	133.1	105.75	4.84	4.98	4.51	3.91
Annual Avg. 1974[5]	153.8	160.1	147.7	115.08	5.44	5.63	4.86	4.21
Annual Avg. 1975[5]	171.5	174.9	161.2	125.79	6.13	6.24	5.39	4.64
Annual Avg. 1976[5]	182.4	183.0	170.5	132.34	6.76	6.87	5.91	4.96
Annual Avg. 1977[5]	195.1	194.2	181.5	140.05	7.28	7.67	6.43	5.39
Annual Avg. 1978[5]	209.4	209.3	195.4	150.42	8.23	8.56	7.02	5.82
Annual Avg. 1979[5]	236.5	235.6	217.4	163.42	9.27	9.50	7.60	6.32
Annual Avg. 1980[5]	274.8	268.8	246.8	178.64	10.26	10.63	8.30	6.94
Annual Avg. 1981	304.1	293.4	272.4	195.51	11.55	11.98	9.12	7.62
Annual Avg. 1982	312.3P	299.3P	289.1	207.15	12.31	12.90	9.98	8.17
Feb 1982	311.4	298.5	283.4	—	12.22	12.61	9.68	7.96
Mar 1982	311.0	298.0	283.1	203.68	12.29	12.69	9.71	8.01
Apr 1982	309.9	298.0	284.3	—	12.23	12.68	9.81	8.03
May 1982	309.6	298.6	287.1	—	12.25	12.71	9.83	8.05
Jun 1982	310.6	299.3	290.6	205.98	12.26	12.91	9.95	8.09
Jul 1982	312.8	300.4	292.2	—	12.23	12.91	10.02	8.18
Aug 1982	313.2	300.2	292.8	—	12.29	12.97	10.03	8.24
Sep 1982	312.7	299.3	293.3	208.51	12.53	13.46	10.20	8.31
Oct 1982	314.3R	299.8	294.1	—	12.50	13.22	10.24	8.34
Nov 1982	315.1P	300.4P	293.6	—	12.52	13.18	10.28	8.38
Dec 1982	315.0P	300.6P	292.4	210.42	12.52R	13.01R	10.34	8.45R
Jan 1983	314.0P	300.0P	293.1	—	12.57P	13.29P	10.35P	8.47P
Feb 1983	314.4P	301.2P	293.2	—	—	—	10.40P	8.53P

P = Preliminary R = Revised since last month

[1] US Bureau of Labor Statistics, Washington, D.C.; "Producer Prices and Price Indexes," Table 6 (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents.

[2] US Bureau of Labor Statistics, Washington, D.C.; Consumer Price Index for All Urban Consumers, US City Average, All Items.

[3] US Department of Commerce, Washington, D.C.; Bureau of Economic Analysis, National Income and Wealth Division; "Survey of Current Business," Table A. The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted.

[4] US Bureau of Labor Statistics, Washington, D.C.; "Employment and Earnings," Table C-2. All data based on 1972 revision of SIC Manual. Data for 1970-1976 are adjusted to the March 1977 benchmark. Data for 1977-1978 are adjusted to the March 1979 benchmark. Data for January 1979 and beyond are adjusted to the March 1980 benchmark.

[5] Monthly data 1970-1978 for Producer Price Index-Industrial Commodities, Consumer Price Index, and Employment and Earnings SIC codes 10, 333, and 28, and quarterly data for GNP Implicit Price Deflator appear on pages 4.6-4.8 of Nuexco Report 139.
Monthly data 1977-1978 for Employment and Earnings SIC Codes 10, 333, and 28 appear on page 33 of Nuexco Report 147.
Monthly data 1970-1978 for Employment and Earnings SIC Code 36 appear on page 23 of Nuexco Report 154.
Monthly data 1979-1980 for Employment and Earnings, Revised Establishment Data, all listed codes, appear on page 22 of Nuexco Report 158.
Monthly data 1977-1980 for Producer Price Index-All Commodities, appear on page 21 of Nuexco Report 158.

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MAY 1983 NUMBER 177

Monthly Report on the Nuclear Fuel Market

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NUEXCO

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EXECUTIVE SUMMARY
REPORT 177

Exchange Value Rose $1.00, to $23.25

The **Exchange Value** as of April 30, 1983 is **$23.25** per pound U_3O_8. Five spot or near-term sales are reported, involving approximately 1.6 million pounds U_3O_8, *equivalent.*

Near-term Supply-Demand Ratio Increased to 3.4:1

Active spot and near-term **uranium supply** amounts to **8.6 million** pounds U_3O_8, *equivalent*, up 15% from last month. **Active** spot and near-term **uranium demand** declined 10%, to **2.6 million** pounds U_3O_8 equivalent. Therefore, the spot and near-term **supply-demand ratio** increased 30 percent, to **3.4:1**.

Transaction Value Rose $0.05, to $21.40

The **Transaction Value** as of April 30, 1983, is **$21.40** per pound U_3O_8. It includes 13 transactions involving a total of 2.8 million pounds U_3O_8 and covers a period of four months.

Conversion Value Declined $0.20, to $1.20

The **Conversion Value** as of April 30, 1983 is **$1.20** per pound U as UF_6, down $0.20 since last month. No conversion transactions are reported. Active sellers are offering 4.0 million pounds U in near-term conversion services, up 33% since last month. Active demand increased 50%, to 1.1 million pounds U.

Loan Use Charge Rate Steady at 6%

The **Loan Use Charge Rate** as of April 30, 1983 is **6 percent** per annum. One loan transaction is reported. Total quantity involved is approximately one million pounds U_3O_8.

SWU Values:
FY83 $103, down $3
FY84 $109, down $1

As of April 30, 1983 the **SWU Value for FY83** is **$103** per SWU, down $3 from last month. That price reflects the dominance of the market by sellers of large quantities of Eurodif-origin SWUs, who are offering significant net discounts relative to the DOE price for SWUs purchased under requirements contracts. Prices offered by those few sellers of DOE SWU remaining in the market are approximately $120 per SWU. The only potential buyers for sizable blocks of FY83 SWU on the secondary market are holders of DOE requirements contracts having 3.5-year termination provisions. However, there are very few who would be willing to terminate at this late date in order to enter the secondary market.

As of April 30, 1983 the **SWU Value for FY84** is $109 per SWU, down $1 from last month. For FY84 SWUs, there is no large differential between prices being offered by sellers of DOE and Eurodif-origin SWUs. This segment of the market is the most active at present. The market for FY85 and beyond remains quiet, awaiting DOE's revelation of the terms and conditions of conversion to the FR contract.

Africa

During the first quarter of 1983, South Africa's overall uranium production from gold-uranium operations, 3.7 million pounds U_3O_8, was essentially unchanged from the fourth quarter of 1983.

Australia

Discusses implications of Labor Party's election victory.

Canada

Federal government insistence on "upgrading" to UF_6 all uranium exports could give US and South African sellers a large commercial advantage.

United States

US Supreme Court upheld California powerplant siting law banning new nuclear plants if permanent disposal of radioactive waste is not provided for, but this action will have no practical effect on the nuclear fuel market.

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NUEXCO REPORT 177
FIGURES OF THE MONTH
(April 30, 1983)

	This Month (Report 177)	Last Month (Report 176)	12 Months Ago (Report 165)
Exchange Value[1]	23.25	22.25	20.75
Transaction Value[1]	21.40	21.35	22.60
Conversion Value[2]	1.20	1.40	1.20
Loan Use Charge Rate[3]	6%	6%	6%
Near-Term Uranium Supply[4]	8.6	7.5	13.0
Near-Term Uranium Demand[5]	2.6	2.9	1.4
Near-Term Supply-Demand Ratio	3.4	2.6	9.3
Current Transactions[6]:			
Number of Transactions	6	7	3
Quantity of Material[7]	1.6-2.8	6.7-7.4+	0.7-1.4
SWU Prices[8]:			
Nuexco SWU Values:			
FY 83	103	106	—
FY 84	109	110	—
USDOE SWU Prices:			
AFC	138.65	138.65	130.75
Requirements	149.85	149.85	138.37
Market Value of Enriched UF_6[9] [10]:			
2.5 w/o U_{235}	616.52	616.48	—
3.0 w/o U_{235}	789.24	790.32	—
3.5 w/o U_{235}	965.04	967.34	—
4.0 w/o U_{235}	1,143.13	1,146.70	—

---

[1] US $ per pound U_3O_8 equivalent

[2] US $ per pound U as UF_6

[3] Per annum

[4] Active inquiries to sell, for delivery within 12 months after contract signing (millions of pounds U_3O_8)

[5] Active inquiries to purchase, for delivery within 12 months after contract signing (millions of pounds U_3O_8)

[6] Uranium sales only; does not include loans, conversion, or SWU transactions

[7] Millions of pounds U_3O_8, equivalent

[8] US $ per SWU

[9] Calculated using the Nuexco Exchange Value, Conversion Value, and 0.20 percent tails assay. Calculations before 2/28/83 used the USDOE price for AFC SWUs. As of 2/28/83, calculations use the Nuexco SWU Value for the relevant fiscal year (currently FY 83).

[10] US $ per KgU as UF_6

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MONTHLY REPORT ON THE URANIUM MARKET

May 1983 No. 177

R. WESLEY MILLER, *EDITOR*

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FOREWORD

Nuexco will host a hospitality suite during the Atomic Industrial Forum/FORATOM International Fuel Cycle Conference in Geneva, Switzerland. The suite will be at the Hotel Intercontinental, May 31-June 3. We look forward to seeing you in Geneva.

* * *

We are pleased to announce that Mr. **Christian (Chris) C. Guitton** joined Nuexco this month as a Marketing Representative. Chris will assist Wayne Fowler in our uranium brokerage operations.

Chris was previously employed at General Electric in the Nuclear Energy Business Group, where he was a Senior Engineer and Manager of the Prototype Fuel Program. He holds a French national diploma (Ecole Nationale Supérieure de Mécanique et d'Aérotechnique), and a Master of Science degree in mechanical engineering (University of Poitiers, France). Chris also holds a California license as a Professional Engineer.

Mr. **James E. Vaughan** addressed the Southern African Metals and Minerals Conference in Johannesburg on April 22, and Mr. **Peter R. Stork** addressed the Annual Petroleum & Mineral Review Conference of Australia's Academy of Science in Canberra on March 23. Copies of their speeches are enclosed with this Report.

* * *

NATURAL URANIUM AND CONVERSION

The **Exchange Value** as of April 30, 1983 rose for the seventh consecutive month, to **$23.25** per pound U_3O_8, up $1.00 since last month. Psychological factors account for the increase. Buyers are simply willing to pay higher prices, as they observe the price recovery which has taken place. However, those buyers who are in the market are exercising discretion, while most sellers holding larger lots are demanding more price incentive before actively participating.

The *Current Market Data* section lists six uranium sales transactions, amounting to more than ten million pounds U_3O_8, equivalent. The five spot or near-term transactions accounted for approximately 1.6 million pounds of the total.

Active spot and near-term uranium supply (material offered at competitive prices, terms, and other conditions) amounts to **8.6 million** pounds U_3O_8 equivalent, up 15 percent from last month's level of 7.5 million. **Active spot and near-term uranium demand** declined to **2.6 million** pounds U_3O_8, equivalent. Therefore, the spot and near-term **supply-demand ratio** increased to **3.4:1**, 30 percent higher than last month's level of 2.6.

* * *

The **Transaction Value** as of April 30, 1983 is **$21.40** per pound U_3O_8, equivalent, an increase of $0.05 since last month. Although five spot or near-term transactions are reported this month, few met the standards for inclusion in the Transaction Value calculation. The current Transaction Value includes 13 transactions involving a total of 2.8 million pounds U_3O_8 equivalent, and covers a period of four months.

* * *

The **Conversion Value** as of April 30, 1983 is **$1.20** per pound UF_6, down $0.20 from last month. No conversion transactions are reported this month. **Spot and near-term conversion supply** (active inquiries to sell conversion services within one year) totals **4.0 million** pounds U, up 33 percent since last month. **Spot and near-term conversion demand** increased by approximately 50 percent, to **1.1 million** pounds U.

The Conversion Value's fourteen percent drop was due to multiple factors, foremost among them the pressure exerted by sellers offering large quantities of secondary market conversion services at or near the current Conversion Value. Although demand has increased, especially in Europe, secondary market conversion supply still outweighs demand by a margin of almost 4 to 1.

* * *

The **Loan Use Charge Rate** remained at six percent per annum. Although one lender has been successful at or near 7 percent, their remaining material would be available for loan as UF_6 only. Nuexco is aware of at least three lenders holding a total of more than three million pounds available for loan as U_3O_8 at 6 percent per annum, but there are few potential borrowers. One loan transaction is reported this month. The total quantity involved is approximately one million pounds U_3O_8.

* * *

The recovery of spot market prices has now continued for seven months. The current Exchange Value approximates market levels prior to the 1982 price break. That break, which saw prices bottom at $17 per pound U_3O_8, was stimulated by intense competition among utilities liquidating inventory and producers selling excess production amounting to more than 15 million pounds U_3O_8.

The recovery must, however, be viewed in its proper context.

1. While any price strengthening is viewed enthusiastically by producers, such enthusiasm should be tempered by the reality that spot market prices have not quite recovered to the levels of late 1981.

2. Substantial inventory, which Nuexco estimates at more than 20 million pounds U_3O_8, remains subject to near-term liquidation. Some of this market is held by producers lacking forward delivery commitments. The largest amount, however, is held by utilities that have financial difficulties or lagging nuclear programs. It seems likely that much of this material will find its way into the market in the near term.

3. While consumption is increasing from year to year as new plants begin operations, annual uranium production, even as the industry contracts rapidly, remains considerably greater than annual consumption. The result is a continuing inventory buildup. Much of this production continues to be delivered, under long-term contracts, to those very utilities that need it least, further increasing the likelihood of liquidation and consolidation in the producer sector.

4. Current spot prices are substantially lower than the prices needed for profitable uranium production in most of the world. Most producers are unwilling to guarantee delivery over the longer term at spot market price levels. Thus, those buyers whose internal policies or regulatory pressures have caused them to insist on spot market pricing find it difficult, if not impossible, to conclude new longer-term supply agreements. Some intermediate

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and longer-term needs probably will be filled by purchases in the spot market well in advance of need (early procurement).

These factors suggest that the spot market in the near term will be described by one of three scenarios.

Under the first scenario, further inventory liquidation will be minimal and spot prices will rise in response to buying pressure. This buying pressure would likely accelerate as the perception grew that the excess inventory would not be liquidated. In such an event, spot market prices could reach the range of $28 to $31 per pound U_3O_8.

The second scenario, which represents the opposite extreme, is a renewed period of inventory liquidation. Its obvious effect would be to drive spot prices down again. In this instance, the possibility of spot prices once again falling below $20 would be quite real.

A third scenario is one in which neither extreme would be realized. Enough inventory would be sold to suppress a large price increase, but the quantities would not be so large as to bring about a new collapse. Early procurement would provide additional support if prices tended to weaken. Under this scenario, spot prices could remain in the range of $22 to $26 per pound U_3O_8 for the near term.

The uranium spot market can be extremely volatile. Unforeseen events such as war, political instability, abrupt changes in national energy plans, or economic stress can overnight invalidate the most carefully conceived forecasts and strategies. It would be risky to formulate a market strategy suitable for only one of the three postulated scenarios. Rather, market participants should formulate a strategy having sufficient flexibility to respond to unexpected price movements.

ENRICHED URANIUM AND SWUs

As of April 30, 1983 the **SWU Value for FY 1983** is **$103** per SWU, down $3 from a month ago. This price reflects the dominance of the market by sellers of large quantities of Eurodif-origin SWUs who are offering significant net discounts relative to the DOE price for SWUs purchased under requirements contracts. Even though, at present, there are virtually no DOE-origin SWUs being offered on the secondary market at competitive prices for FY 1983 delivery, competition among sellers has enabled the few buyers to obtain prices approximately $10 below their break-even prices of $112.39 ($149.85 for DOE requirements contracts, less 25 percent penalty for partial termination of a requirements contract having 3.5-year termination provisions).

The potential market for sizable blocks of SWU for FY 1983 delivery is still comprised of those DOE customers holding requirements contracts having 3.5-year termination provisions. Among that group, there are very few, if any, having FY 1983 deliveries who would be willing to terminate at this late date and buy replacement SWUs on the secondary market. DOE's standard policy requires 6 months' notice for the specification of enrichment assays and quantities to be delivered, so most such buyers who were willing to use the secondary market have already terminated and purchased replacement SWU before the six-month deadline. It is unlikely that many new such buyers will enter the market at this late stage.

The few sellers of DOE-origin SWU for FY 1983 delivery are presently offering at approximately $120 per SWU (at 0.20 percent tails assay). They are primarily holders of enriched product inventory wishing to sell SWU by means of de-enrichment swaps. There is little interest at present for buyers in completing transactions at this price level. However, there are some potential buyers of FY 1983 seeking small quantities in excess of their requirements contract appendix A ceilings, or due to unexpected changes in their fuel needs. Any such buyers would likely have to pay prices substantially above $103, the current SWU Value for FY 1983, if they wished to purchase DOE-origin SWUs.

As of April 30, 1983 the **SWU Value for FY 1984** is **$109** per SWU, down $1 since last month. The price reflects SWU prices available for delivery in FY 1984 from sellers of both Eurodif-origin and DOE-origin SWU. This segment of the secondary SWU market is very active. A number of buyers holding DOE requirements contracts having 3.5-year termination provisions are seeking secondary market supply to replace deliveries scheduled for mid-to-late FY 1984. These buyers hope to complete secondary market SWU purchases in time to allow them to terminate their FY 1984 requirements contract deliveries with more than one year's notice. It appears probable that most DOE FY 1984 SWUs now available on the secondary market at competitive prices will be sold within the next few months. In that event, the remaining DOE 3.5-year requirements contract holders who wish to terminate in FY 1984 could face the same choice that many faced in FY 1983, that of whether to accept full-priced supply in the form of DOE-origin SWUs or to purchase Eurodif-origin SWUs at a discount.

The market for FY 1985 and later remains quiet, as it has for the past several months. Potential sellers continue to await DOE's announcement of the terms and conditions of conversion to the FR (Facility Requirements) contract. That announcement had been expected in late April or early May, but has been delayed yet again.

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CURRENT MARKET DATA

EXCHANGE VALUE $23.25/lb. U_3O_8
Determined as of April 30, 1983

Definition[1]

The Exchange Value is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the last day of the month.

Derivation

Nuexco bases the Exchange Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Exchange Value:

A. The price of uranium delivered or to be delivered under old contracts.
B. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.

[1] In December, 1981, Nuexco published a history of the Exchange Value which chronicled, month-by-month, changes in its definition, usage and derivation. Copies are available upon request.

TRANSACTION VALUE[2]
Determined as of April 30, 1983

$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
21.40	2.8	13	4

Definition

The Transaction Value is a weighted average price of recent transactions, and is based on prices paid for U_3O_8 in transactions closed within the previous three-month period and for which delivery was scheduled within one year of the transaction date. At least ten transactions totaling at least two million pounds U_3O_8 are included in each calculation, or the sample time is extended as necessary to include these minima. Foreign currencies are converted to US dollars as of the transaction date.

Comments

Nuexco does not consider the following in determining the Transaction Value:

A. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.
B. The price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of Exchange Value or any other independent variable. Also excluded from consideration are all data where the delivery price is defined in such a way that it cannot currently be determined.

[2] Transaction Values for 1976 through 1981 and their associated parameters (millions of pounds, number of transactions and number of months) are tabulated on pages 31 and 32 of Report 161. Corresponding data for 1982 are tabulated on page 5 of Report 173.

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CURRENT MARKET DATA

CONVERSION VALUE[1] $1.20/lb. U as UF_6
Determined as of April 30, 1983

Definition

The Conversion Value is Nuexco's judgment of the price at which spot and/or near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the last day of the month.

Derivation

Nuexco bases the Conversion Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Conversion Value:

A. The price of conversion services delivered or to be delivered under old contracts.
B. The price of conversion services delivered in connection with contract renegotiations or other than arm's length transactions.

[1] Monthly data for 1981 and 1982 are tabulated on page 6 of Report 173.

LOAN USE CHARGE RATE[2] 6%
Determined as of April 30, 1983

Definition

The Loan Use Charge Rate is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the last day of the month.

Derivation

Nuexco bases the Loan Use Charge Rate upon:

A. Data from recently completed or pending loan transactions.
B. Rates included in firm proposals to borrow or lend.
C. Rates that potential borrowers and lenders have expressed as a willingness to pay or accept, but for which Nuexco is not aware of firm proposals.

[2] Monthly data for 1968 through 1981 appear on pages 32-34 of Report 162. Monthly data for 1982 appear on page 2 of Report 173.

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CURRENT MARKET DATA

SWU VALUE $103/SWU for FY83
SWU VALUE $109/SWU for FY84
Determined as of April 30, 1983

Definition

The SWU (Separative Work Unit) Value is Nuexco's judgment of the price, expressed in US dollars per SWU, at which transactions for the sale of significant quantities of SWU of any origin for delivery in the specified DOE fiscal year could be concluded as of the last day of the month.

Derivation

Nuexco bases the SWU Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.
E. SWU prices at varying tails assays and varying product assays are converted to the equivalent SWU price at the DOE Reference Transaction Tails Assay (presently 0.20 weight percent U_{235}) and a product assay of three percent U_{235} assuming feed costs calculated using the Nuexco Exchange Value and Nuexco Conversion Value determined as of the last day of the same month.

Comments

Nuexco does not consider the following in determining the SWU Value:

A. The price of SWU delivered under long-term contracts from primary suppliers, such as DOE, Urenco, or Eurodif.
B. The price of SWU delivered under other than arm's length transactions.

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CURRENT MARKET DATA

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates	per kg U_3O_8 in Concentrates	per kg U in Concentrates
Australia (dollar)	26.79	59.05	69.64
Belgium (comm. franc)	1,134	2,500	2,949
Canada (dollar)	28.52	62.87	74.14
Finland (markka)	126.43	278.72	328.68
France (franc)	171.46	378.00	445.76
FRG (mark)	57.22	126.16	148.77
Italy (lira)	34,191	75,379	88,889
Japan (yen)	5,532	12,195	14,381
Netherlands (guilder)	64.35	141.87	167.30
South Africa (rand)	25.34	55.87	65.88
Spain (peseta)	3,185	7,022	8,280
Sweden (krona)	173.90	383.38	452.09
Switzerland (franc)	48.04	105.90	124.89
UK (pound)	14.91	32.88	38.77
US (dollar)	23.25	51.26	60.44

TRANSACTION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates	per kg U_3O_8 in Concentrates	per kg U in Concentrates
Australia (dollar)	24.65	54.35	64.10
Belgium (comm. franc)	1,044	2,301	2,714
Canada (dollar)	26.25	57.87	68.24
Finland (markka)	116.37	256.55	302.53
France (franc)	157.82	347.93	410.29
FRG (mark)	52.67	116.12	136.93
Italy (lira)	31,471	69,381	81,816
Japan (yen)	5,092	11,225	13,237
Netherlands (guilder)	59.23	130.58	153.99
South Africa (rand)	23.32	51.42	60.64
Spain (peseta)	2,932	6,463	7,621
Sweden (krona)	160.06	352.87	416.12
Switzerland (franc)	44.21	97.48	114.95
UK (pound)	13.73	30.26	35.69
US (dollar)	21.40	47.18	55.64

[1] Calculated using currency exchange rates published in the Wall Street Journal on April 29, 1983.

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